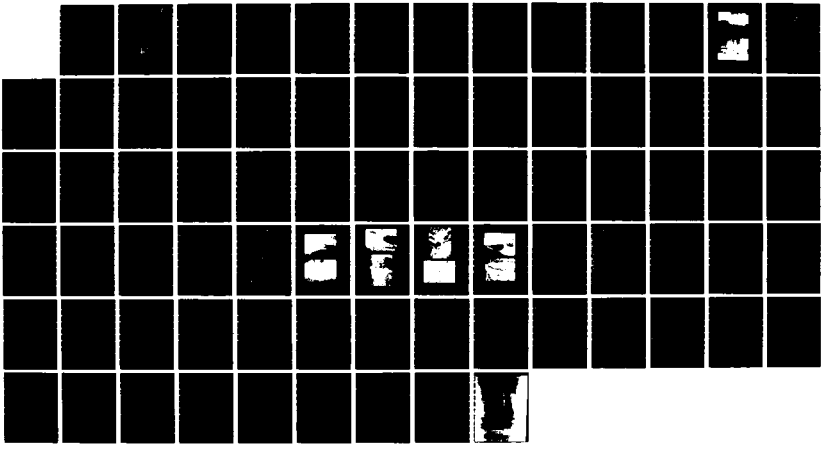
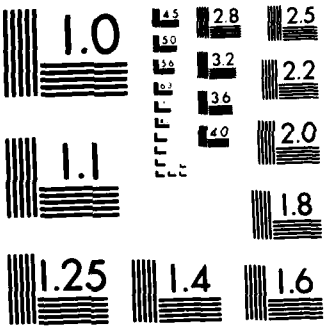
AD-A144 082 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
CRESCENT LAKE DAM (CT.. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV NOV 78

UNCLASSIFIED F/G 13/13 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

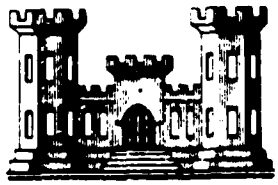
AD-A144 082

CONNECTICUT RIVER BASIN
ENFIELD, CONNECTICUT

CRESCENT LAKE DAM
CT 00277

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DTIC FILE COPY



DTIC
ELECTE
AUG 13 1984
S D
D

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

84 08 09 026

NOVEMBER 1978

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00277	2. GOVT ACCESSION NO. AD-A144 042	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Crescent Lake Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE November 1978 13. NUMBER OF PAGES 45
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Connecticut River Basin
Enfield, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Crescent Lake Dam is about 600 ft. long, 12 ft. high and has a crest width of about 15 ft. It is an earthen embankment with a downstream slope of about 2 to 1 and a variable upstream slope. Based on both height and storage capacity, Crescent Lake Dam is classified as a small dam. The dam is in fair condition.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED

JAN 23 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

I am forwarding to you a copy of the Crescent Lake Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, State of Connecticut, Department of Corection, P.O. Box G, Hazardville Station, Enfield, Connecticut 06082.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

Accession For
NTIS GRA&I
DTIC TAB
Unannounced
Justification
By
Distribution/
Availability Codes
Dist | Avail and/or Special
A/1
DTIC COPY INSPECTED 2

CRESCENT LAKE DAM

CT 00277

CONNECTICUT RIVER BASIN
ENFIELD, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.:	CT 00277
Name of Dam:	Crescent Lake Dam
Town:	Enfield
County and State:	Hartford County, Connecticut
Stream:	Freshwater Brook
Date of Inspection:	25 September 1978

BRIEF ASSESSMENT

Crescent Lake Dam is about 600 ft. long, 12 ft. high and has a crest width of about 15 ft. It is an earthen embankment with a downstream slope of about 2 to 1 and a variable upstream slope. There is no orthodox spillway structure, but an unlined channel in the reservoir bank near the right abutment serves as a wasteway for reservoir spills. An outlet canal takes off from the reservoir about 600 ft. upstream from the left abutment, which has a concrete headwall incorporating a 38 in. wide notch with stoplog slots. There appears to be no other outlet structure. Maximum storage capacity is about 335 acre-feet. Crescent Lake, used now for recreational purposes, is less than a mile long, has a surface of about 36 acres and a drainage area of about two square miles.

Based on both height and storage capacity, Crescent Lake Dam is classified as a small dam. Because the area downstream is principally marshland or flat agricultural land, with a few scattered commercial or industrial properties, the dam has been classified as having a low hazard potential.

The dam is in fair condition. There is some seepage along the downstream toe of the embankment, which has large mature trees growing on it. The lack of any outlet gate precludes draining the lake without breaching the dam.

The test flood would not overtop the dam but would reach within 1/2 ft. of the crest and overtop areas of reservoir bank adjacent to both left and right abutments, which appear to be as much as 2 ft. lower than the crest of the dam. It appears that the valley area east of the Penn Central Railroad track which is just downstream from the dam would absorb outflows up to the test flood magnitude without major consequences to downstream interests.

Within one year of receipt of the Phase I Inspection Report the owner, Connecticut Department of Correction, should retain the services of a registered professional engineer to make further investigations and to implement the results. These studies should cover: (1) potential overtopping of low saddles near dam abutments, (2) provision of a new spillway structure, (3) provision of a new outlet structure, (4) seepage along the toe of the embankment, and (5) strengthening of outlet canal headwall structure.

The owner should also implement the following measures: (1) monitor the downstream toe seepage during periods of high reservoir level, (2) remove trees growing on the dam, (3) implement a consistent program of inspection and maintenance, and (4) develop and implement a formal surveillance and warning system to be exercised during flood events.

Peter B. Dyson
Project Manager

Frederick Esper
Vice President

This Phase I Inspection Report on Crescent Lake Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Richard F. Doherty

RICHARD F. DOHERTY, MEMBER
Water Control Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Joseph A. McElroy

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

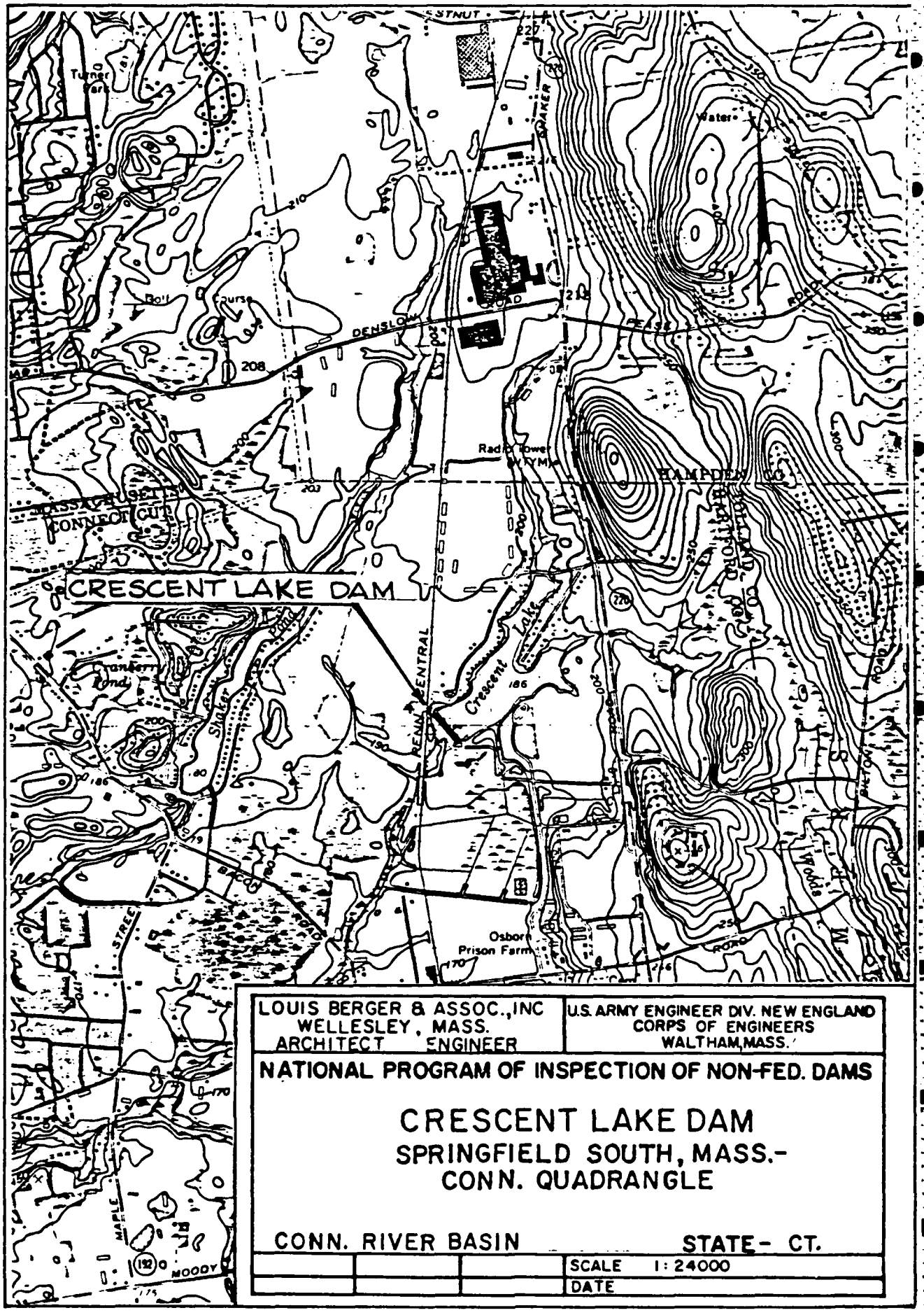
TABLE OF CONTENTS

Table of Contents (continued) Page

CRESCENT LAKE DAM OVERVIEWS

Overview from left abutment.

Overview from right abutment.



LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

CRESCENT LAKE DAM

SPRINGFIELD SOUTH, MASS.-CONN. QUADRANGLE

CONN. RIVER BASIN STATE- CT.

			SCALE 1:24000
			DATE

PHASE I INSPECTION REPORT

CRESCENT LAKE DAM CT 00277

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Louis Berger & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Louis Berger & Associates, Inc. under a letter of 24 August 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0371 has been assigned by the Corps of Engineers for this work.

b. Purpose

1. Perform technical inspection and evalution of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

Crescent Lake Dam is located in Hartford County, Connecticut, on Freshwater Brook, a tributary of the Connecticut River, at a point about 2/3 miles south of the Connecticut-Massachusetts

border. The reservoir is operated as a recreational facility and a number of homes close to shoreline have been built along the west and north shores of the lake. The dam is on the property of the Connecticut Correctional Institution, Enfield (formerly known as the Osborn Prison Farm). The lake is bounded on the east by Taylor Road and on the south by Shaker Road. A branch line of the Penn Central Railroad passes to the right of the dam and reservoir.

The dam was originally constructed by a Shaker colony to provide water power and a water supply for farm lands downstream, but is not being utilized to much extent for that purpose at present.

b. Description of Dam and Appurtenances

The dam consists of an earth embankment 600 ft. long with a height of about 12 ft. The crest width is about 15 ft. and the downstream slope is about 2 to 1. The upstream slope appears irregular. There is no concrete spillway, but an unlined channel skirts the right end of the dam which has an entrance about 3 ft. below the top of the embankment, serving as a wasteway for reservoir spills. The entrance to this channel has a pile of loosely placed cobblestones with a few sandbags for a length of about 28 ft.

An outlet canal takes off from the reservoir about 600 ft. upstream from the left abutment and skirts the left side of the valley to serve various canal laterals. The canal has a top width of about 30 ft. There is a concrete headwall across the canal about 375 ft. downstream from the reservoir bank in which a 38 in. wide notch has been constructed, incorporating stoplog slots. There appears to be no other outlet structure. Appendix D Plates 2 and 3 show a sketch plan and profile of the dam and appurtenant structures.

c. Size Classifications

The height of the dam above the downstream channel bed is 15 ft. The storage capacity of the lake at maximum pool elevation is about 335 acre-ft. With a storage of less than 1,000 acre-ft. and a height of less than 40 ft., Crescent Lake Dam is classified as a small dam in accordance with the criteria promulgated in the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Although there are numerous private residences around Crescent Lake itself, the area downstream which would receive the greatest impact from flood waters in the event of a dam

failure consists of flat marshland or institutional farm land. Even if a flood were to overtop the confining railroad roadbed, the wave would be dissipated in the marshlands surrounding Freshwater Brook. A few scattered commercial or industrial properties along Shaker Road could sustain some damage but due to the small volume and low head of water involved it would probably be minor in nature. Consequently, Crescent Lake Dam is considered to have a low hazard potential and is so classified in accordance with The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the State of Connecticut, Department of Correction.

f. Operator

Mr. Richard M. Steinert, Superintendent
Connecticut Correctional Institution, Enfield
P.O. Box G
Hazardville Station
Enfield, Connecticut 06082

telephone: (203) 749-8391, Ext. 1

g. Purpose of Dam

The dam impounds a lake now used for recreational purposes.

h. Design and Construction History

The dam is said to have been constructed by a Shaker colony to provide water power and a water supply for several farm settlements in the vicinity. The outlet canal and laterals evidently date back to the original construction.

From correspondence in the files of the CT Department of Environmental Protection, it appears that the concrete headwall across the outlet canal was constructed by prison authorities in 1939, at the same time that a small concrete dam was built about 1/2 mile downstream. This dam was intended to provide a small reservoir for prison farm uses, stated as being: "fire protection, watering stock, sprinkling, canning vegetables, swimming, etc." The intent of the outlet canal headwall was to provide a means of controlling flow down the canal using stoplogs and, in particular, to try and prevent flooding like that which occurred on 21 September 1938 when, it is said: "the land below the pond was covered by a vast lake."

i. Normal Operational Procedure

There are no formal operational procedures. Since the prison farm is no longer functioning, a regular supply of water via the canal is no longer required. Prison authorities control the reservoir level by adjusting the canal headwall stoplogs and/or the cobblestones and sandbags at the entrance to the overflow channel, to satisfy the needs of lakeside residents.

1.3 Pertinent Data

a. Drainage Areas

The total drainage area of Crescent Lake Dam is approximately 2.05 square miles of which some 55% lies in the State of Massachusetts and 45% lies in the State of Connecticut. Most of this area is undeveloped with private residences occurring in small groups along the few secondary roads in the region. The topography of the drainage area ranges from flat farmland to gently rolling hills whose maximum relief is about 200 feet.

b. Discharge of Damsite

1. There are no discharge conduits at the Crescent Lake Dam.

2. There are no records of discharge or flood stages for this dam.

3. Ungated spillway capacity at maximum pool elevation 189.25 MSL is 725 cfs.

4. There is no spillway discharge with outlet canal stoplogs in place at normal pool elevation 186 MSL.

5. Outlet capacity at maximum pool elevation 189.25 with canal stoplogs in place is 360 cfs.

6. Discharge over the right and left abutment saddles at maximum pool elevation 189.25 is 1,530 cfs.

7. Total discharge capacity at maximum pool elevation is 2,615 cfs.

c. Elevation (ft. above MSL)

1. Top of Dam - 189.25

2. Maximum pool-design surcharge - 187.42

3. Full flood control pool - N/A

4. Recreation pool - 186

5. Spillway crest - 187 (assumed 186 effective since cobblestones pass water)

6. Upstream portal invert diversion tunnel - none

7. Stream bed at toe of dam - 171

8. Maximum tailwater - unknown

d. Reservoir

1. Length of maximum pool - 4,000 feet

2. Length of recreational pool - 3,000 feet

3. Length of flood control pool - N/A

e. Storage (acre-feet)

1. Recreational pool - 210

2. Flood control pool - N/A

3. Design surcharge - 50

4. Top of dam - 335

f. Reservoir Surface (acres)

1. Top dam - 47

2. Maximum pool - 47

3. Flood-control pool - N/A

4. Recreational pool - 36

5. Spillway crest - 36

g. Dam

1. Type - Earthen

2. Length - 600 feet

3. Height - 12 feet

4. Top width - 15 feet

5. Side slopes - 2:1 downstream - variable upstream

6. Zoning - unknown

7. Impervious core - unknown

8. Cutoff - unknown

9. Grout curtain - none (assumed)

h. Spillway

1. Type - natural depression on right abutment covered with loosely piled cobble riprap. Cobble-strewn stream channel bottom at elevation 183 MSL at this location.

2. Length of spillway - 48 feet

3. Crest elevation - 186

4. Gates - none

5. U/S channel - none

6. D/S channel - steeply sloping, boulder & cobble strewn channel is cut fairly deeply into the terrain for several hundred feet downstream.

7. General - although the crest height of the riprap is 187, the lake level is maintained a foot lower due to the rapid passage of water through the upper foot of stone.

i. Regulating Outlets

There is a 375 foot long raceway outlet on the east shoreline which leads to a concrete outlet control notch and weir. The width of the raceway and control structure is about 30 feet and the crest is at elevation 186. In the center of the structure is a 3'-2" wide stoplog regulated control notch whose sill is at elevation 184.3. With the stoplogs in place the lake level is maintained at elevation 186. The outlet canal was originally utilized for the supply of water to the prison farm property immediately downstream. This outlet is no longer utilized for supplying water although it does function as a water level control for the lake.

SECTION 2 - ENGINEERING DATA

2.1 Design

No data on the design of the dam or appurtenances has been recovered and probably none exist. A sketch plan is shown in Appendix D, page D-7.

2.2 Construction

Nothing is known about the construction of the dam except that it was carried out by Shaker colonists. The outlet canal control structure was apparently built in 1939 by prison authorities.

2.3 Operation

Operation of the dam by the prison authorities is on an informal, ad hoc basis, largely in response to the requests of lake shore residents.

2.4 Evaluation

a. Availability

Since no engineering data is available, it is not possible to make an assessment of the safety of the embankment. The basis for the information presented in this report is principally the visual observations of the inspection team.

b. Adequacy

Without any engineering data, a definitive review and assessment of the adequacy of this dam is impossible. The evaluation is based primarily on visual inspection, and engineering judgment, while taking into account the history and past performance of the dam.

c. Validity

Not applicable.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The visual inspection of Crescent Lake Dam took place on 25 September 1978. The dam appears to be in fair condition. There is some seepage along the downstream toe of the embankment for about 300 ft. beginning at the left abutment, without any major seepage points. There is also evidence of seepage into the emergency outlet channel which bends around the downstream slope from the vicinity of the right abutment. Brush has been cleared, but there are a number of mature trees up to 3 ft. in circumference on the embankment. The outlet canal is clear of significant growth.

b. Dam

The reservoir water surface at the time of the inspection was at a level of about 3.25 ft. below the top of the dam. Assuming that the reservoir was at the established water level, elevation 186 MSL (since no flow was passing through the spillway channel and an identifiable spillway control sill was not apparent) the top of the dam is assumed to be elevation 189.25. The measured distance from the top to the toe of the dam at its maximum section is about 12 ft. The crest width of the dam is about 15 ft. and the downstream slope is about 2 to 1. The upstream slope could not be measured below reservoir water line, and above water line the slope was uneven and in places approached near vertical because of the absence of riprap and vegetation growth. The length of embankment is estimated to be about 600 ft., of which the left 450 ft. is straight and right 150 ft. curves around the right abutment rim of the reservoir.

There are about 15 mature trees on the upstream slope and numerous others along the crest and downstream slope (Appendix C Photo No. 1). Some small burrows about one inch in diameter were noted in the vicinity of the roots of at least one tree. There is a general seepage condition along the toe of the downstream slope for about 300 ft. from the left abutment. No major seepage points were noted, but rather just a general accumulation of water (Appendix C Photo No. 2). One small pothole was also noted on the downstream slope about 45 ft. from a concrete monument near the left abutment. The underlying soil appears to be a fine sand

which is susceptible to erosion. The total seepage through the dike is of the order of 0.2 to 0.3 cfs.

c. Appurtenant Structures

1. Spillway

There is no orthodox concrete or masonry spillway, but instead an unlined channel skirts the right end of the dam with its entrance about 3 feet below the level of the top of the dam, which serves as a wasteway for reservoir spills. The channel is deeply incised into the reservoir bank. It does not appear that this was the location of the original stream channel, but rather that it is an excavated cut of some depth constructed to carry flows around the dam. The channel has been excavated through a sandy material, but it appears to have been scoured and enlarged from its original depth and size by subsequent outflows from the reservoir (Appendix C Photo No. 4). At a point about 100 ft. from the lake the channel bends to the left where it flows almost parallel to the dam before joining the original stream and turning right. The flow in the channel increased noticeably from this point at the time of the inspection, and there was evidence of seepage coming from the reservoir side of the channel (Appendix C Photo No. 6).

No control sill was evident at the entrance to this channel. A pile of loosely placed cobblestones and an occasional sandbag and plastic sheeting, for a length of about 28 ft., have been placed at the entrance (Appendix C Photo No. 3). The channel grade drops steeply at about 15 percent gradient for about 20 ft., then continues at a lesser slope downstream. The channel where it traverses opposite the right end of the dam is about 40 ft. from the reservoir shore line, is about 20 ft. wide, and its bottom grade is about 8 ft. below reservoir water surface level. The banks of this channel are very steep to practically vertical.

No flow was discharging through the spillway entrance at the time of the inspection, so it is assumed that some sort of impervious sill exists at the observed reservoir level, elevation 186. The loosely placed cobble barrier appeared to be very pervious, such that it would not form a control sill for regulating reservoir levels. The channel downstream from the

entrance is strewn with cobbles for about 60 ft. (Appendix C Photo No. 4).

The reservoir bank between the spillway and right end of the dam for a length of about 250 ft. is more than a foot lower than the top of the dam, such that for reservoir surcharges greater than about 2 ft. above normal level this area would be overtopped and spills would empty into the spillway outlet channel skirting the right abutment. Because of the sandy nature of the foundation, it would appear that the abutment material would erode rapidly from an overtopping of any consequence, and a breach in this area could be expected. Similarly, for a distance of over 150 ft. to the left of the left abutment of the dam the ground level is lower than the dam by as much as 2 ft., thereby providing a trough through which flows would escape from the reservoir, thus also threatening a breach in this area.

2. Outlet canal

An outlet canal takes off from the reservoir about 600 ft. upstream from the left abutment of the dam, skirting the left side of the valley below the dam to serve various canal laterals traversing the valley lands. The outlet canal is about 30 feet in top width with its bottom about 3 ft. below the reservoir water surface observed at the time of the inspection. At a distance of about 375 ft. downstream from the canal entrance a headwall has been constructed in which a 38 in. wide notch incorporating stoplog slots has been provided. The sill of the notch was 17 in. below the reservoir level and the top of the headwall was 17 in. above the reservoir surface. Several stoplogs were in place to prevent discharges to the downstream canal. The top of the headwall, measuring about 30 ft. long, would act as a controlled overflow spillway when the reservoir reached a level of about 1.5 ft. above the water level observed. Spills over this headwall would flo· down the canal and then spread out through the laterals onto the fields below the dam. Although the capacity through the notch would be quite small, by removing the stoplogs the reservoir could be lowered to the sill or to about 1.5 feet below the normal storage elevation 186 MSL.

d. Reservoir Area

The shorelines both appear to be quite stable for a distance of several thousand feet upstream, being flat

to gently sloping, with no evidence of sliding or sloughing.

e. Downstream Channel

The excavated channel described in c.1. above joins the original stream channel below the dam, which crosses under the Penn Central Railroad embankment about 1,000 ft. downstream through a 5 ft. by 5 ft. concrete box culvert, and then continues southwesterly. The rail line traverses the valley in a north-south direction so that overbank flow above the culvert in excess of that which could be carried through the culvert would spill over and flow down the valley into the large agricultural and swamp areas east of the railroad embankment. This area is estimated to be about 2 miles long and about 1,500 ft. wide, or to consist of over 300 acres. If the railroad embankment is such that it would not overtop and breach, it could be expected that a flood wave caused by a breach at the dam would be absorbed in this portion of the valley.

3.2 Evaluation

The visual inspection of the dam revealed sufficient information to permit an assessment of those features affecting the safety and stability of the structure to be made. The dam and appurtenant works are judged to be in fair condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The Connecticut Correctional Institution, Enfield, operates the dam on an ad hoc basis. There appear to be no formal operating procedures. The Superintendent says that the reservoir level is regulated to suit the Crescent Lake Association which represents the lake shore residents. This is accomplished by adjustment of the canal headwall stoplogs and/or the cobblestones in the entrance to the emergency outlet channel.

4.2 Maintenance of Dam

According to the Superintendent, Connecticut Correctional Institution, Enfield, maintenance is carried out as needed using prison labor. This work appears to be limited to keeping brush cut on the embankment, removing vegetation from the outlet canal and general tidying up in the vicinity of the dam.

4.3 Maintenance of Operating Facilities

The stoplog notch in the outlet canal headwall appears to be adequately maintained. It is kept locked to prevent vandalism. According to the Superintendent, vandalism by removal of cobblestones from the emergency outlet has been troublesome. Although on Institution property, the outlet immediately adjoins the property line which is not fenced in that area.

4.4 Warning System

There is no formal warning system or program at this dam. A program should be evolved, with sequences and responsibilities for emergency situations defined and personnel trained in its implementation.

4.5 Evaluation

Operational and maintenance procedures, though not formalized, appear to be generally satisfactory. Emergency warning procedures should be developed.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

The hydraulic and hydrologic characteristics of Crescent Lake Dam and its drainage area were evaluated in accordance with criteria presented in the Recommended Guidelines for Safety Inspection of Dams. As indicated in Section 1.2, paragraphs c & d of this report, Crescent Lake Dam is accorded a small dam classification with a low hazard-potential rating. Consequently, the test flood selected to evaluate the dam's capacity was that resulting from a 100-year frequency precipitation event.

The volume, duration, and distribution of precipitation for the 100 year storm were obtained from U.S. Weather Service Technical Paper No. 40. The precipitation values were modified to reflect variations in the size of the drainage area, duration of the storm and infiltration rates. The storm's precipitation data as well as surcharge storage capacity and spillway discharge capacity of the dam were then input to the HEC-1 computer program, along with a dimensionless unitgraph unique to the drainage area of Crescent Lake. Printouts of the inflow hydrograph, flood routing and discharge hydrograph produced by the program may be seen in Appendix D, pages D-13 thru D-21.

As indicated, a 100 year frequency storm would produce an inflow flood whose peak would reach 2,038 cfs 4½ hours after the start of the rainfall event. Detention in the lake would reduce the peak inflow slightly resulting in a maximum discharge from the lake of 1,776 cfs approximately 5 hours after the start of the storm. A comparison of the discharge hydrograph with the discharge curve presented in Appendix D indicates the test flood would raise the water elevation to about 188.75 MSL, which is 1/2 ft. below the crest of the dam. However, as indicated on the discharge curve, certain low-lying portions of the left and right abutments would be overtopped slightly but it is not anticipated that the overflows would affect the dam adversely.

An approximate breakdown of the discharges through the various passageways is the following:

Outlet canal	245 cfs
Spillway channel	545 cfs
Saddle to left of dam	340 cfs
Bench between dam and spillway channel	646 cfs
Total	1,776 cfs

b. Experience Data

There is no gauging station in the vicinity of Crescent Lake. No information is available with respect to the 21 September 1938 flood stage or any previous or subsequent flood events.

c. Visual Observations

1. General

There is no conventional concrete or masonry spillway. An emergency outlet channel near the right abutment has a pile of cobblestone riprap at its entrance, which is stated to be subject to vandalism. It appears that at normal reservoir level, virtually no water flows down this channel. The pool level is regulated by means of stoplogs in a 38 in. wide notch in a concrete headwall in the outlet canal. The reservoir banks both appear to be lower than the top of the dam for some distance in the vicinity of the dam abutments.

2. Upstream Damage Potential

The homes constructed along and close to the shore line of Crescent Lake, if built within the freeboard space of the reservoir, may be vulnerable to partial inundation from surcharge storage. The number of homes so situated is not known, but if many were to be affected the best remedy would be to increase the spillway capacity and thereby reduce needed surcharge storage to handle a specific flood. This is discussed in Section 7.

d. Overtopping Potential

As previously indicated, the 100-year frequency test flood would peak about 1/2 foot below the crest of the dam. However, portions of the lake's perimeter between the dam and the lakes discharge channels are at a lower elevation than

the dam and will be overtopped during the test flood. While the easterly saddle is a large flat-lying area which would experience no detrimental effects from overtopping, the low portion of the westerly abutment is contiguous with the spillway and the west end of the dam and is more susceptible to the debilitating effects of being overtopped. Both shoreline depressions are depicted on the schematic sketch of the dam and its appurtenances in Appendix D.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The field investigations of the earth embankment revealed no significant displacements or distress which would warrant the preparation of slope stability computations based on assumed soil properties and engineering factors. Data on the engineering characteristics of the embankment material is not available.

b. Design and Construction Data

No plans or calculations of value to a stability assessment are available for this dam.

c. Operating Records

There are no operating records for this dam.

d. Post Construction Changes

The results of the field inspection produced no evidence of changes which might influence stability.

e. Seismic Stability

The dam is located in Seismic Zone No. 1 and, in accordance with recommended Phase I guidelines, does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

On the basis of the Phase I visual examination, the condition of Crescent Lake Dam is judged to be fair at the present time. The deficiencies revealed are not of major concern in view of the low hazard potential classification for this dam.

The reservoir banks both to the right and left of the main dam embankment are as much as 2 feet lower than the crest of the dam. These low saddles limit the amount of surcharge and consequently the magnitude of the flood which can be accommodated before these low points are overtopped. If these saddles were diked to the level of the top of the dam, or higher, added surcharge storage space and thus a higher magnitude flood could be handled before there would be a risk of failure by breaching. However, for a flood routing comparable to that noted in Section 5, more spillway capacity would have to be provided to substitute for the outflows assumed through the saddle areas and benches in the routing analysis.

There is no spillway control structure, as such, to regulate the outflows from the reservoir. No control sill was detected under the cobblestone barrier placed across the spillway channel entrance, and it is judged that this barrier and its underlying earthen foundation could be quickly eroded if a substantial outflow was released through the channel. At the least, a concrete sill should be constructed to establish a normal storage level in the reservoir and to provide a positive regulation for spillway outflows. A more substantial structure might be considered, such as a wider apron structure, with upstream and downstream cutoff walls, sufficient to lend protection from erosion below the structure.

Flow through the outlet canal control headwall will be confined to the 38 in. wide notch for reservoir levels up to elevation 187.42. With the reservoir rising above that level, the headwall will be overtopped and the structure will then act as an auxiliary spillway. At elevation 188.8, the overflow head will be 1.38 feet and the discharge will approximate 245 cfs over the 30 ft. long headwall. At top of

dam elevation 189.25 the discharge will be about 360 cfs. Except for the unprotected canal banks beyond the 30 ft. long wall, which would be subject to erosion and probable breaching, and at the canal floor which could erode and thereby undermine the headwall, there appears to be no objection to utilizing this structure as an auxiliary outlet device to augment spillway capacity.

Large flows of the magnitude noted would undoubtedly overtax the capacity of the canal and its banks would be overtopped, and some damage to the canal and laterals would result. Such damage, however, would seem to be less serious than that which could be brought about by a breaching of the dam proper.

If the railbed grade is built sufficiently high to impound up to about 400 acre feet before it overtops, it appears that the valley area east of the Penn Central railroad could absorb outflows from Crescent Lake for flood inflows up to somewhat more than 100 year frequency magnitude. In the event of a breach either through the saddle left of the dam, through the bench right of the dam, through the spillway entrance, or through the dam proper and applying the "rule of thumb" guidance procedure suggested by the Corps of Engineers N.E.D., for a 100 ft. breach width the peak failure outflow might be in the order of 7,000 cfs. However, the total reservoir storage at the time of failure would be only in the range of 300 to 400 acre feet, so that the flood surge would be quickly diminished by the more than 300 acre valley storage area downstream east of the railroad bed. It appears, therefore, that a failure of the dam or abutments would not result in major consequences to downstream interests.

b. Adequacy of Information

The information available is such that the assessments of the condition of the dam and appurtenant structures have been made solely on the basis of the visual inspection.

c. Urgency

The dam appears to be in no immediate danger of becoming a hazard to life and property. The recommendations and remedial measures enumerated below should be implemented by the owner within two years after receipt of this Phase I Inspection Report.

d. Need for Additional Investigation

Additional investigations are required as recommended in Para. 7.2.

7.2 Recommendations

It is recommended that the owner should retain the services of a registered professional engineer with suitable experience to make investigations, studies and, if proved necessary, design remedial measures for the following:

a. Saddles at Dam Abutments

The saddle to the left of the dam, which is estimated to be at a level about 2 ft. below that of the top of the dam, is a grassy area which might withstand a slight overtopping without serious erosion, but would undoubtedly be eroded and breached with a 2 ft. flow through the area. It appears that the entire reservoir rim should be surveyed and low points diked to bring the level up to that of the dam crest. Similarly, the bench between the right abutment of the dam and the spillway channel should be diked where not occupied by a spillway control structure, to a level up to or higher than the crest of the dam.

b. Spillway

The spillway inlet and downstream channel, as they now exist, do not provide a positive control for regulating outflows from the reservoir, nor are they adequately protected against erosion and eventual failure in the event of large spills. If the low areas at the dam abutments are diked to forestall spills and breaching in these areas, the spillway capacity should be increased to substitute for such outflows if the same flood is to be accommodated. A 100 ft. spillway crest could accommodate about 1,500 cfs at the reservoir elevation 188.8 noted in Section 5 and about 1,800 cfs at top of dam elevation 189.25. This outflow, plus that obtained through the outlet channel, would roughly equal that used in the flood routing study of the 100 year frequency flood. It is therefore suggested that a concrete spillway control and apron structure should be provided, of about 100 ft. crest length, about mid-point of the bench between the right end of the dam and the present spillway entrance. The present spillway entrance should best be diked off since the wider bench will provide a better site for an apron type spillway.

c. Outlet Headwall Structure

To prevent a breaching around the existing outlet canal headwall in the event of an overtopping of the wall, the earthen abutments beyond the wall should be raised and strengthened to accommodate the higher heads, or the headwall extended and raised beyond its present length to close off flows around the structure. The canal floor downstream from the headwall should be protected with a concrete apron or riprap to forestall erosion and undermining of the wall.

d. New Outlet Works

The feasibility of providing a new outlet structure to provide the ability for draining the reservoir should be studied.

7.3 Remedial Measures

The owner should take the following actions:

1. Provide a drain along the seepage zone at the toe of the downstream slope to facilitate monitoring of the seepage, which should be done periodically during periods of high reservoir level and at least once a year.

2. Remove the trees on the upstream slope of the dam, including the stumps, and fill all holes with well graded and compacted soil.

3. Develop a formal flood warning system. An operational procedure to follow in the event of an emergency should also be adopted.

a. Operation & Maintenance Procedures

The owner should institute procedures for a biennial periodic technical inspection of the dam and appurtenant works, with supplementary inspections of any suspect items. A checklist for periodic inspections should be developed and records should be kept of all maintenance and repair work performed. Ordinary maintenance, such as cutting brush and repairing structures, should be carried out in accordance with a regular and consistent program.

7.4 Alternatives

The only appropriate alternatives to these recommendations appear to be: (1) breaching the dam, and (2) maintaining the reservoir at a lower pool elevation.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION
PHASE I

Identification No. 00277 Name of Dam: Crescent Lake Dam

Date of Inspection: 25 September 1978

Weather: sunny, clear Temperature: 65°F±

Pool Elevation at Time of Inspection: assumed at elevation 186.0 MSL

Tailwater Elevation at Time of Inspection: assumed at elevation 171.0 MSL

INSPECTION PERSONNEL

Peter B. Dyson	Louis Berger & Associates, Inc.	Project Manager
Carl J. Hoffman	Louis Berger & Associates, Inc.	Hydraulics, Structures
Thomas C. Chapter	Louis Berger & Associates, Inc.	Hydrology, Soils
William S. Zoino	Goldberg Zoino Dunnicliff & Assoc., Inc.	Soils

OWNER'S REPRESENTATIVE

Raymond Corrigan	Connecticut Department of Correction	Chief of Engineering Services
Edward Bartold	Connecticut Department of Correction	Maintenance Supervisor

VISUAL INSPECTION CHECKLIST

Identification No. CT 00277 Name of Dam: Crescent Lake

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
EMBANKMENT Vertical alignment and movement	No movement observed.
Horizontal alignment and movement	No movement observed.
Unusual movement or cracking at or near the toe	None observed.
Surface cracks	None observed.
Animal burrows and tree growth	Some small burrows observed. 30-40 mature trees. Brush cleared.
Sloughing or erosion of slopes	None observed.
Riprap slope protection	None.
Seepage	Some seepage observed along downstream toe. No major seepage points.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00277 Name of Dam: Crescent Lake

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
Piping or boils	None observed.
Junction of embankment and abutment, spillway and dam	No special problems observed.
Foundation drainage	None.
OUTLET WORKS Approach channel	Canal 32'± wide, 375' long.
Outlet conduit concrete surfaces	None.
Intake structure	None.
Outlet structure	Concrete gravity wall across canal with wing wall and 3' x 3' notch slotted for boards.
Outlet channel	Canal 30'± wide x 3'-6"± deep.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00277 Name of Dam: Crescent Lake

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
Drawdown facilities	Removal of boards across notch in outlet wall.
SPILLWAY STRUCTURES Concrete weir	Pile of rubble and sandbags.
Approach channel	None.
Discharge channel	Natural stream (Freshwater Brook) 22'± wide x 8'± deep with 4' x 4' box culvert under railroad 1,000' downstream.
Stilling basin	None.
Bridge and piers	None.
Control gates and operating machinery	None.
INSTRUMENTATION Headwater and tailwater gages	None.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00277 Name of Dam: Crescent Lake

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
Embankment instrumentation	None.
Other instrumentation	None.
RESERVOIR Shoreline	Wooded, gently sloping, appear stable. Extensive housing development on west and north shores.
Sedimentation	None observed.
Upstream hazard areas in event of backflooding	Homes at low elevations close to shoreline.
Alterations to watershed affecting runoff	No recent alterations noted.
DOWNSTREAM CHANNEL Constraints on operation of dam	None. When capacity of Freshwater Brook 4' x 4' culvert under railroad is exceeded flow diverts to wide flat valley south of dam.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00277 Name of Dam: Crescent Lake Sheet 5

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
Valley section	2,000'± wide south of dam.
Slopes	Railroad embankment on west, gentle slope on east sides. Woods and agricultural land.
Approximate number of homes/population	None. Scrapyard, ready-mix plant, fertilizer plant, stables, etc., at intersection Shaker Road and railroad.
OPERATION & MAINTENANCE FEATURES Reservoir regulation plan, normal conditions	No formal plan. Lake raised or lowered at request of Crescent Lake residents by changing boards in control structure notch.
Reservation regulation plan, emergency conditions	None.
Maintenance features	Brush cut and canal cleared regularly.

APPENDIX B

PAST INSPECTION REPORTS

COPY

COPY

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

27 September 1976

Mr. Richard Steinart, Supt.
Osborne Div. CT State Prison
Shaker Road
Enfield, Connecticut 06082

Re: Crescent Lake Dam
Enfield

Dear Mr. Steinart:

Pursuant to your recent telephone call, the subject dam was inspected on September 20, 1976.

The seepage observed along the downstream toe of the earthern embankment has been noted on past inspections. Since the rateof flow has not increased appreciably and there was no evidence of material being removed from the dam, we have no reason to feel the safety of the dam is jeopardized at the present time.

We are, however, concerned with the woodchuck burrows which were observed on the downstream slope. Due to the sandy type of soil, piping action could develop through the dam and result in dam failure. The woodchucks should be eradicated and the burrows filled as soon as possible.

In addition, brush growth should be removed from the dam and an area approximately 10' beyond the toe of the dam. This will allow better monitoring of any seepage through the dam and also discourage rodents from burrowing into the slope.

The recently planted pine trees on the embankment should be removed. From the standpoint of proper dam maintenance, trees should not be allowed to grow on dams. There is always a possibility that they may be blown over in a windstorm causing a breach in the structure. Consideration should be given to the removal of some of the large trees that have been allowed to grow on the dam.

Finally, it appears that additional stones have been placed in the natural water course outlet of the lake located on the northwest side. The resulting increase in water elevation reduces the amount of freeboard available

immediately westward of the outlet. This low area could readily be overtopped during a severe storm and lead to failure of the embankment. Either the elevation of this overflow stone weir should be lowered or fill material placed in the low area.

Since the above-mentioned alterations to the dam are of a maintenance nature, a construction permit from this office will not be required. However, any activity that might affect the normal lake elevation should be cleared with the local Inland Wetlands Agency. The Planning and Zoning Commission of Enfield also functions as the Inland Wetlands Agency.

Please feel free to contact me if you have any questions.

Very truly yours,

Victor F. Galgowski
Supt. of Dam Maintenance
Water Resources Unit
Telephone no. 566-7245

VFG:ljk

cc: Mrs. Jude Brennan

STATE OF CONNECTICUT
DEPARTMENT OF CORRECTION
CONNECTICUT CORRECTIONAL INSTITUTION, ENFIELD
P.O. BOX G, HAZARDVILLE STATION, ENFIELD, CONN. 06082

OFFICE OF THE SUPERINTENDENT

October 5, 1976

WATER RESOURCES
UNIT
RECEIVED
OCT 7 1976
ANSWERED
REFERRED
FILED

Mr. Victor F. Galgowski
Supt. of Dam Maintenance
Water Resources Unit
Dept. of Environmental Protection
State Office Building
Hartford, Connecticut 06115

Dear Mr. Galgowski:

re Crescent Lake Dam

I received your letter of September 27 regarding my inquiry as to the Crescent Lake dam. I certainly appreciate the rapidity with which you answered our inquiry.

I also appreciate your comments regarding the cleaning off of the downstream slope, the woodchuck burrows, and the elimination of the recently planted pine trees on the top of the breast. These things we will take care of immediately; in fact, we have started the work this morning.

You commented on the stones placed in the natural water course outlet of the lake located on the northwest side; this was done by us at the request of the Crescent Lake Association. In that you have indicated it will possibly cause some difficulties, we will remove them. It is a bit difficult in terms of complying with all of the requests of the people of the Crescent Lake Association. There appears to be some differences of opinion as to what is good for the organization; I am assuming this is of an internal nature.

I certainly appreciate your taking the time to look into our request. Please be assured that your suggestions and comments will be taken care of immediately. Thank you very much.

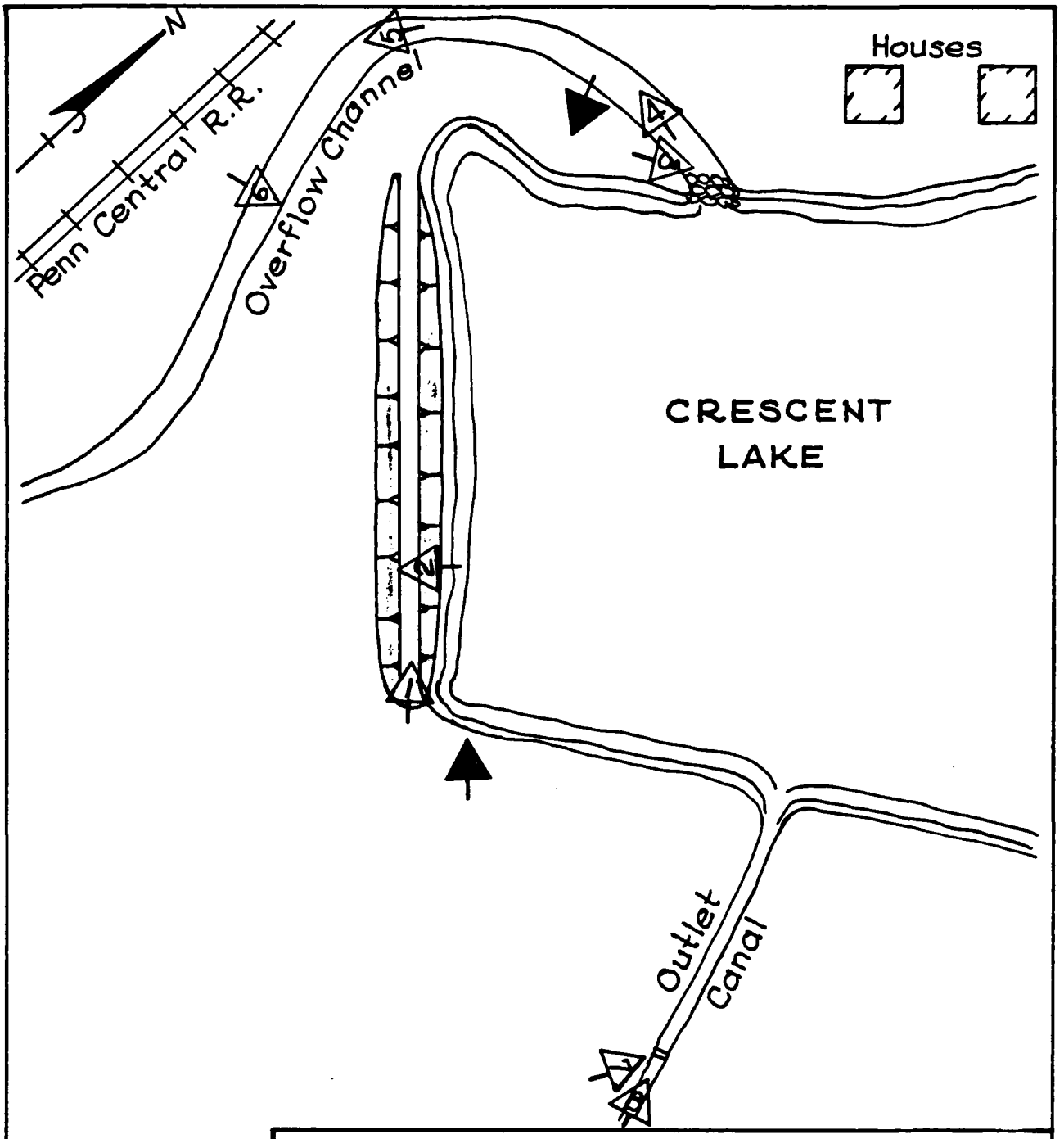
Sincerely,

Richard M. Steinert
Superintendent

RMS/elm

APPENDIX C

SELECTED PHOTOGRAPHS



Appendix 'C' Photos →

Overview Photos →

LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT · ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

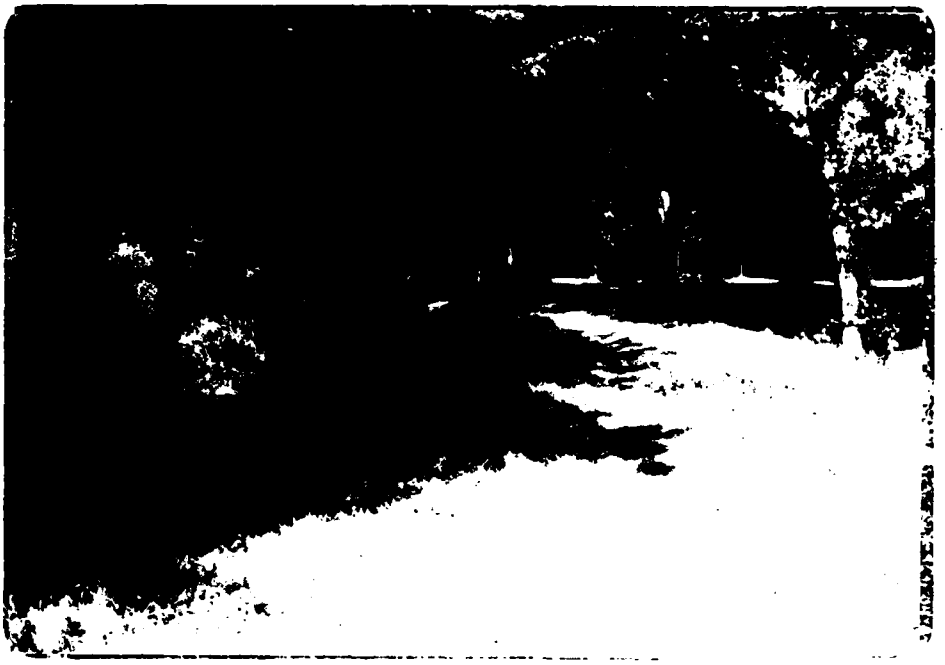
CRESCENT LAKE DAM

SKETCH PLAN SHOWING LOCATION & ORIENTATION OF PHOTOS

STATE - CT.

SCALE	1:24000
DATE	

CRESCENT LAKE DAM

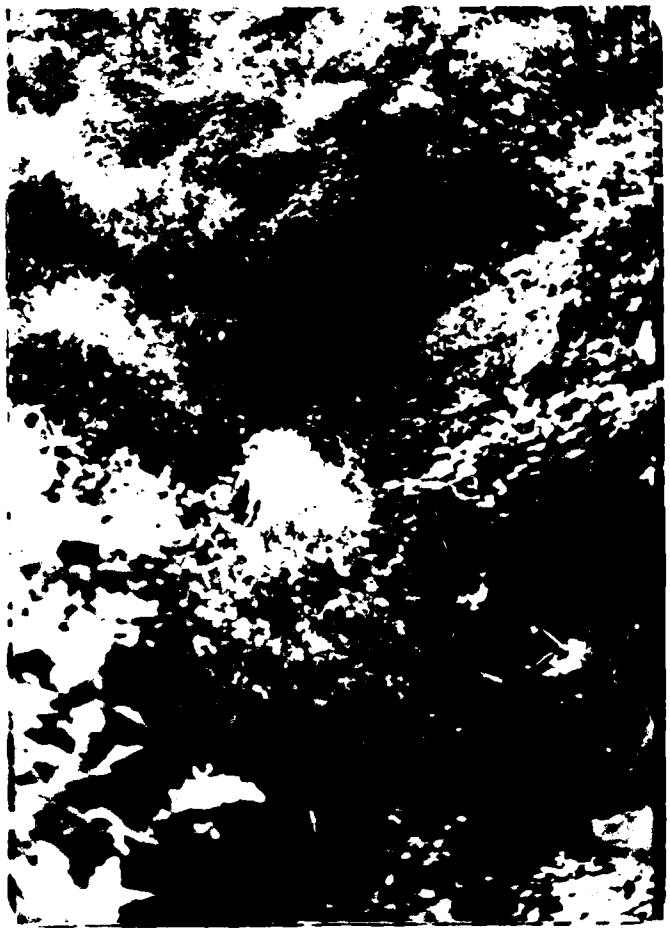


1. General view of dike showing numerous mature trees

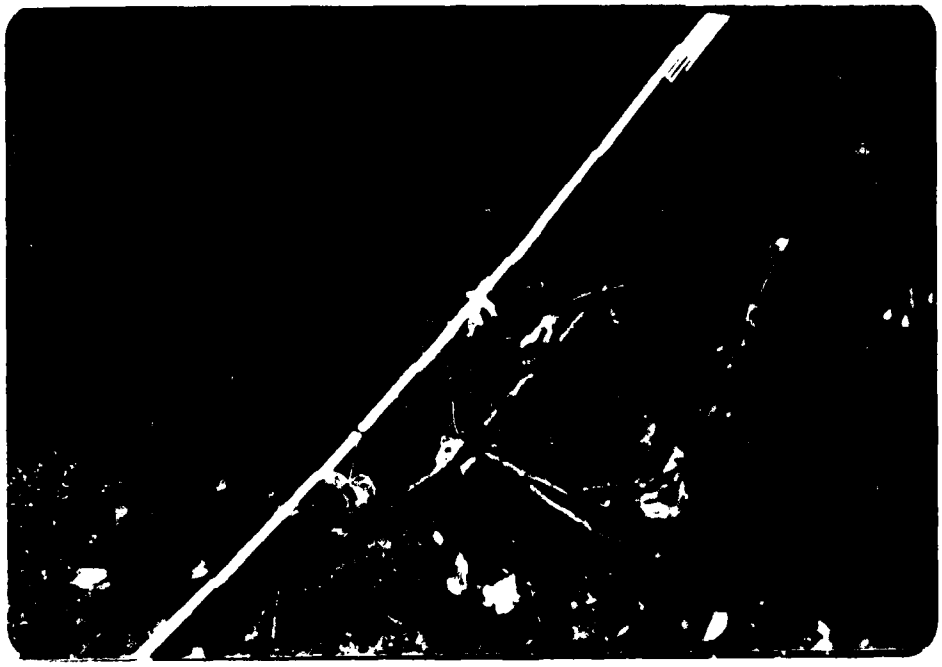
2. Wet condition below seepage area at toe of downstream slope

3. Overflow channel with cobblestone entrance area

4. Overflow channel 50 ft. downstream from entrance



5. Overflow channel 150 ft. downstream from entrance



6. Minor seepage from fine sand slope in overflow channel

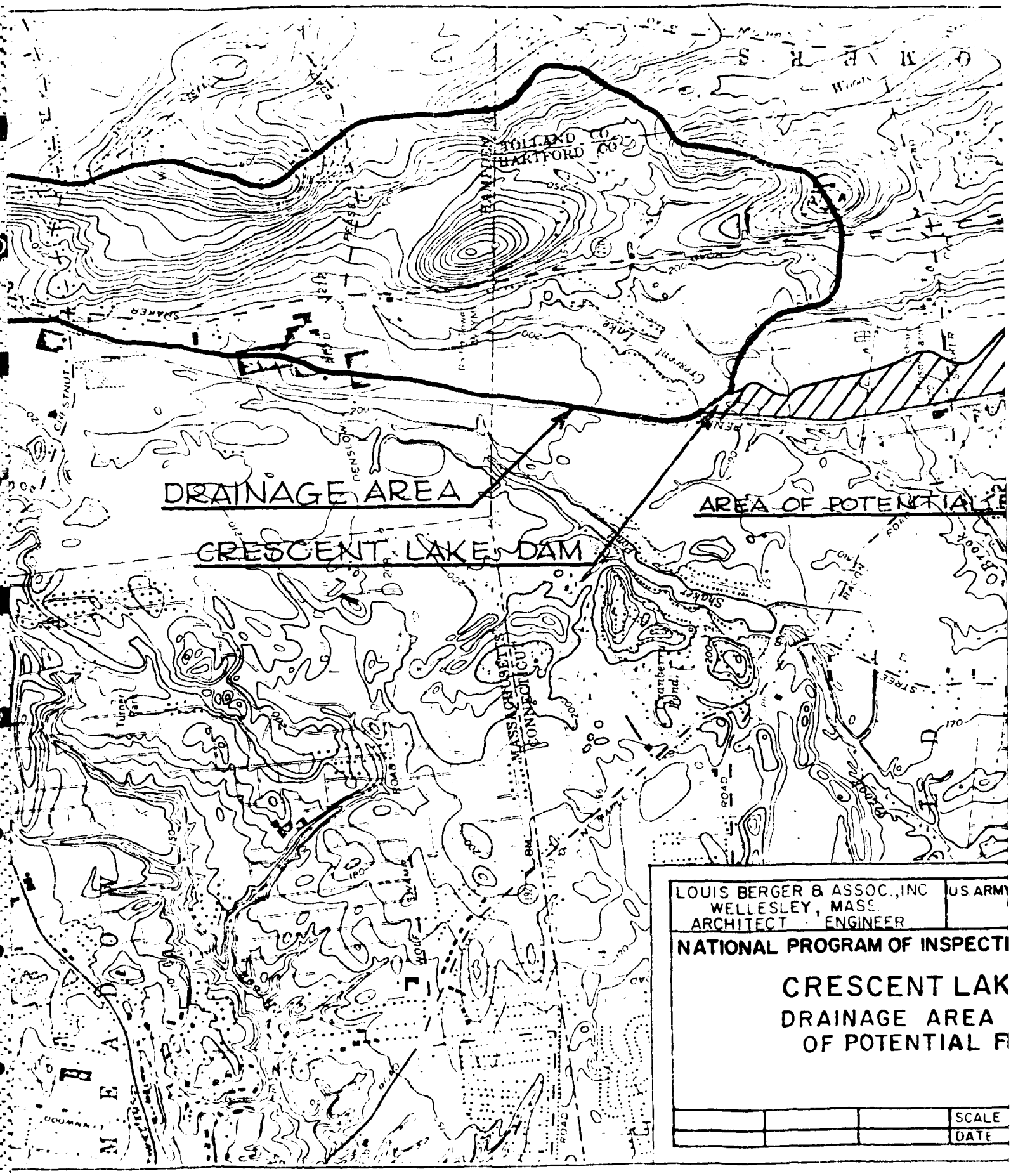
7. Concrete headwall across outlet canal with notch and stoplogs

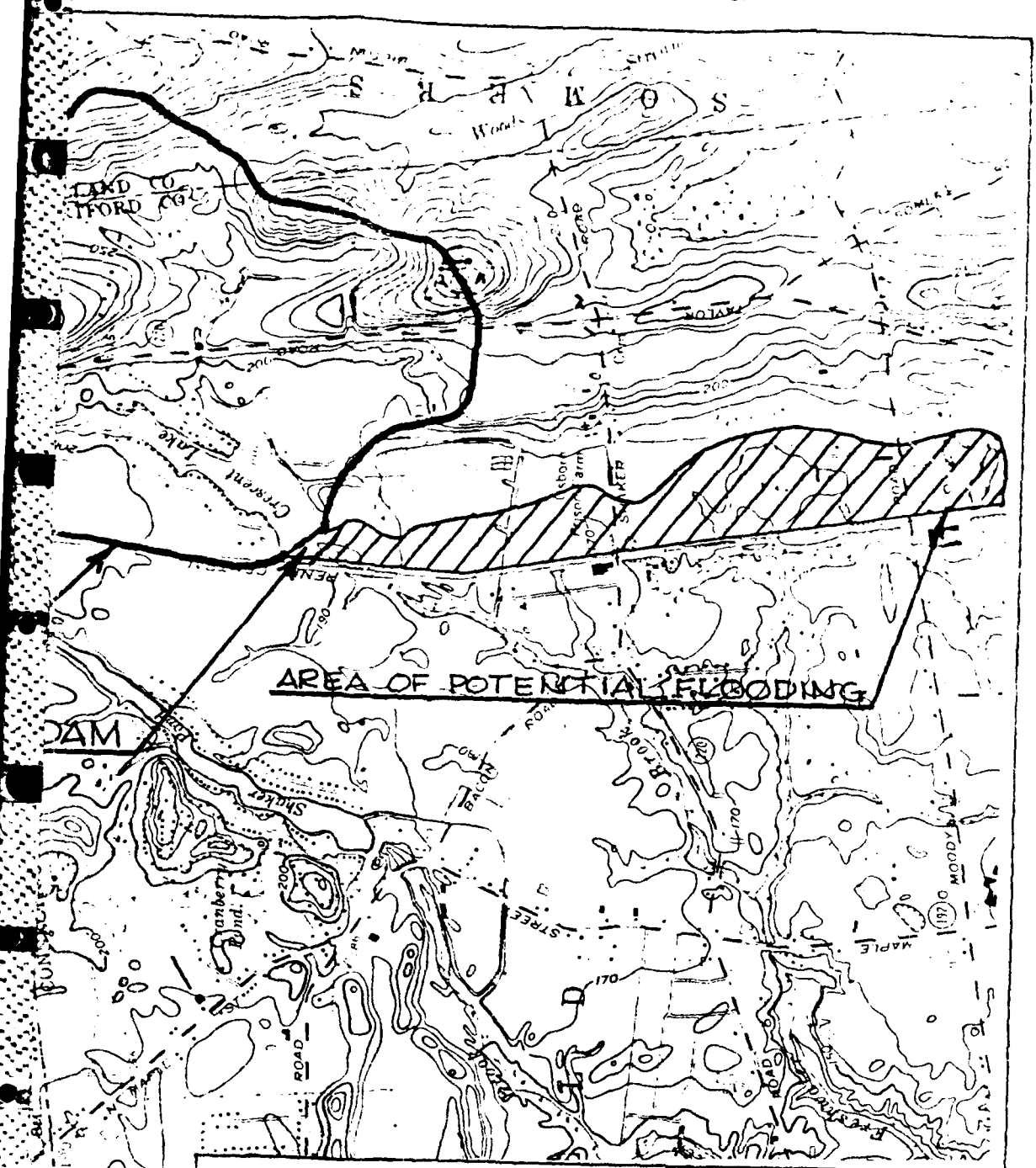
8. Canal downstream from concrete headwall structure

APPENDIX D

HYDROLOGIC & HYDRAULIC COMPUTATIONS

N
East Longmeadow
McCarthy Hill Sch
Birchland Park Sch
Porter Lake
DRAINA
CRES


DRAINAGE AREA
CRESCENT LAKE DAM
AREA OF POTENTIAL F
TOLLAND CO
HARTFORD CO
MASSACHUSETTS
CONNECTICUT
LOUIS BERGER & ASSOC., INC
WELLESLEY, MASS
ARCHITECT ENGINEER
US ARMY
NATIONAL PROGRAM OF INSPECTI
CRESCENT LAK
DRAINAGE AREA
OF POTENTIAL F
SCALE
DATE



LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT · ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

CRESCENT LAKE DAMS

DRAINAGE AREA AND AREA OF POTENTIAL FLOODING

STATE - CT.

			SCALE 1:24000
			DATE

BY JL DATE 10/5

CHKD. BY ____ DATE ____

SUBJECT Precipitation Data

LOUIS BERGER & ASSOCIATES INC.

Crescent Lake

SHEET NO. ____ OF ____

PROJECT W-189

Classification - Hazard - Low
Size - Small

Test flood - 50 yr to 100 yr freq.

From TP-40 - 100 yr storm = 5" inches / 6 hrs
50 yr storm = 4.3 inches / 6 hrs

Time	Rainfall	Δ	Rea Δ	Infil Loss
.25'	1.62	1.62	.04	.03
.5'	2.25'	.63	.04	
.75'	2.5'	.25	.05'	
1	2.75'	.25	.05'	
.25'	2.94	.19	.11	
.5'	3.13	.19	.11	
.75'	3.32	.19	.12	
2	3.5'	.18	.12	
.25'	3.63	.13	.18	
.5'	3.76	.13	.19	
.75'	3.88	.12	.19	
3	4.0	.12	.19	
.25'	4.12	.12	.25'	
.5'	4.24	.12	.63	
.75'	4.35'	.11	1.62	
4	4.46	.11	.25'	
.25'	4.55'	.09	.13	
.5'	4.64	.09	.13	
.75'	4.73	.09	.12	
5'	4.82	.09	.12	
.25'	4.87	.05'	.09	
.5	4.92	.05'	.09	
.75'	4.96	.04	.09	
6	5.0	.04	.09	

BY ____ DATE 9/69

CHKD. BY ____ DATE ____

SUBJECT Surcharge Storage Capacity

LOUIS BERGER & ASSOCIATES INC.

Crescent Lake #5

SHEET NO. ____ OF ____

PROJECT W-189

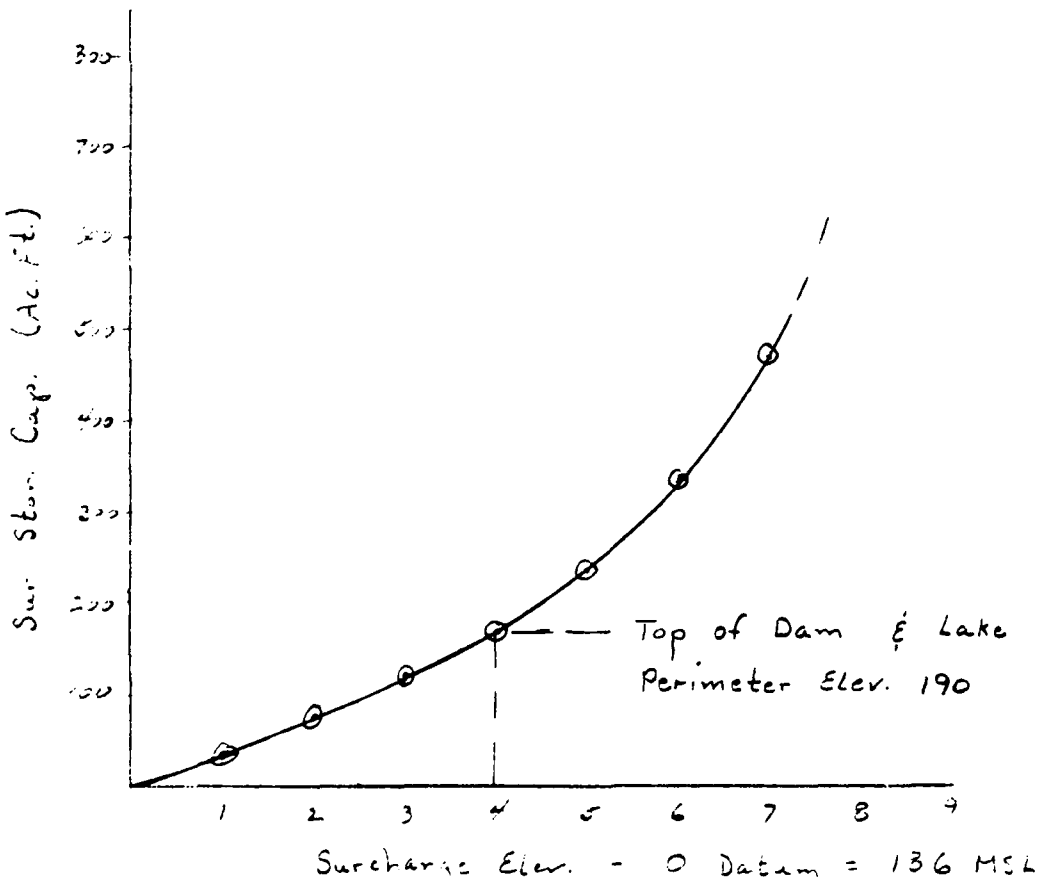
Planimetered Areas - Elev. datum = MSL

Lake at El. 186 - 35.8 Ac.

Contour El. 190 - 48.8 Ac.

R.R. El. 193 - 152.4 Ac.

El.		Sur. Stor. Cap. (Ac.Ft.)
193	48.8 Ac — 51.8 Ac	471
192	34.5	336
191	17.3	235
190	48.8 Ac	
190	35.8 Ac — 6.5 Ac	169
189	4.9 Ac	122
188	3.3 Ac	78
187	1.6 Ac	37
186	35.8 Ac	0



BY K DATE 12/85 | **LOUIS BERGER & ASSOCIATES INC.** | SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ | Crescent Lake | PROJECT 10-189

SUBJECT Lag Time & Dimensionless Unitgraph

Tc based on avg. vel. of 2 fps from WSN-TP-1PW-5

L = 11,990 feet H = 39 ft Slp = < 1%

$T_c = \frac{11{,}990}{2(3600)} = 1.67$ hr. Lag = 0.6 Tc = 1.00 hr.

Unit Time (D) = .25 hr.

T_p = Lag + D/2 = 1.13 Area = 2.05 mi²

Time	T/Tp	Q/Qp	Discharge
.25	.22	.092	80.8
.5	.44	.34	298.5
.75	.66	.702	617.1
1	.88	.954	837.7
.25	1.11	.974	855.2
.5	1.33	.813	713.9
.75	1.54	.62	544.4
2	1.77	.441	387.2
.25	1.99	.325	285.4
.5	2.21	.237	208.1
.75	2.43	.1725	151.4
3	2.65	.122	107.1
.25	2.88	.0888	780
.5	3.10	.0672	59.0
.75	3.32	.0500	439
4	3.54	.0346	30.4
.25	3.76	.0266	234
.5	3.98	.0187	16.4
.75	4.20	.0144	12.6
5	4.42	.0104	9.1
.25	4.65	.0075	6.6
.5	4.87	.0053	4.6
.75	5.09	.0024	2.1

BY O.T DATE 7-22-78 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 of 1 OF

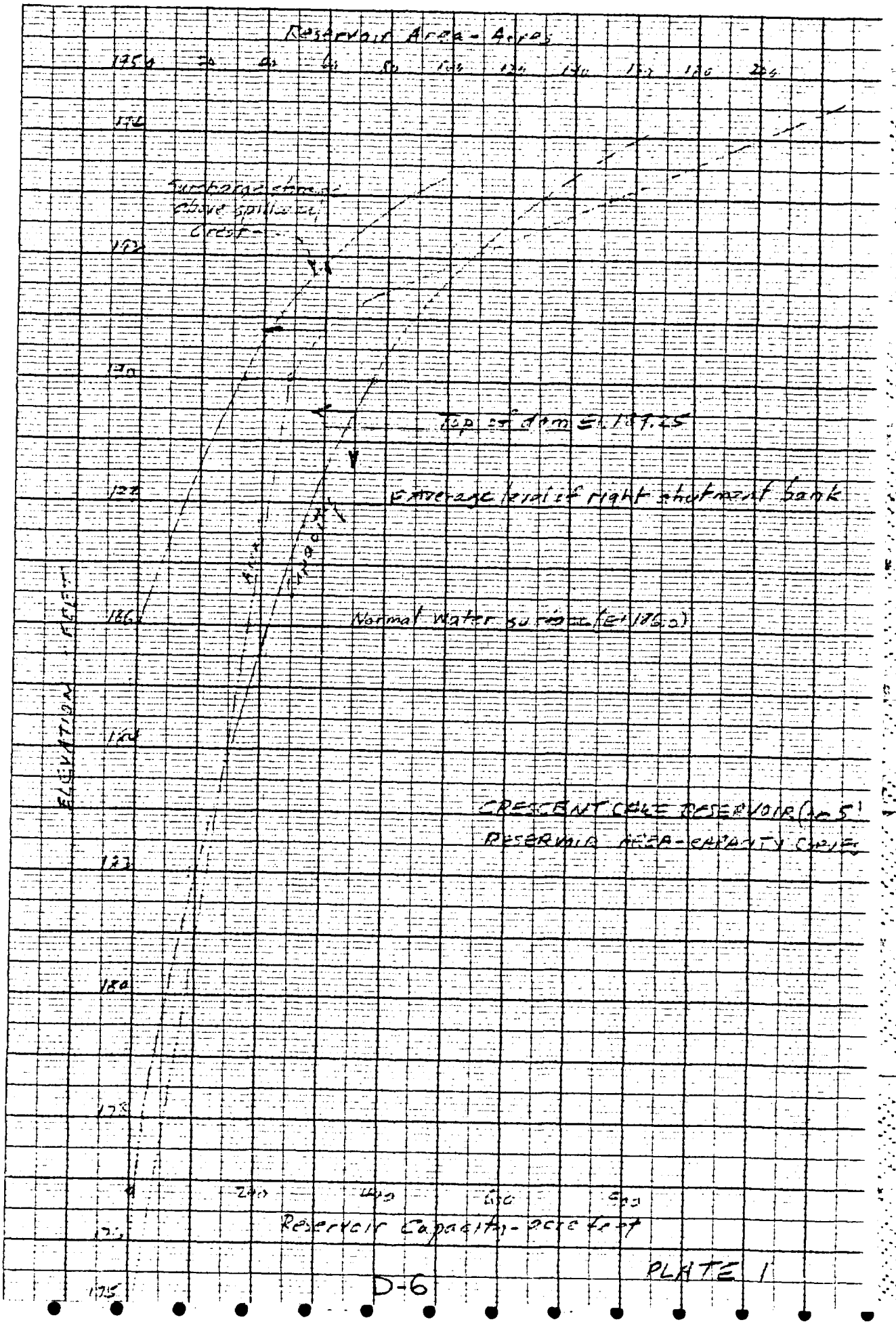
CHKD. BY _____ DATE _____ INSPECTION OF DAMS - CONN + RI. PROJECT _____

SUBJECT CRESCENT LAKE RESERVOIR (NO 5)

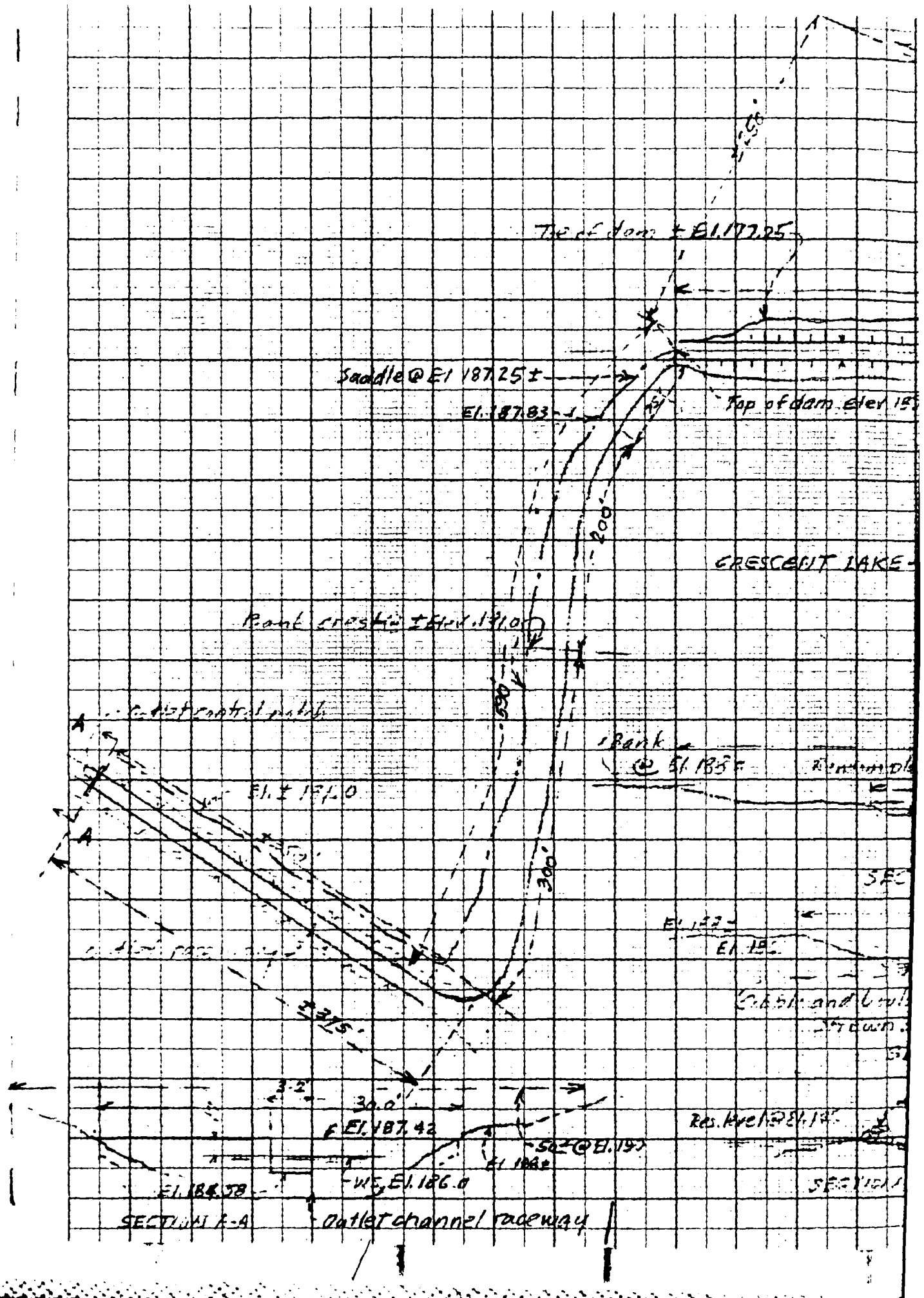
Area capacity curves

Res El.	Area	Av. Area	H	ΔVR	ΣVR	Surcharge volume
174					0	
178	11.0	5.5	4	22	22	
182	23.5	17.25	4	69	91	
186	35.8	29.7	4	119	210	0
190	48.7	42.3	4	169	379	169
191	65	56.9	1	57	436	226
192	106	85.5	1	86	522	312
193	152	129		129	651	441

PLOTTED ON PLATE 1.



KE STANDARD ® CROSS SECTION
10 X 10 TO THE HALF INCH


Top of dam ± El. 197.25
Saddle @ El 187.25 ±
El. 187.83
Top of dam. elev 19
200'
CRESCENT LAKE
Bank crest @ Elev. 191.0
Bank
@ El. 185 ±
El. ± 181.0
300'
El. 192
El. 19
30.0'
℄ El. 187.42
Res. level @ El. 19
El. 186.58
El. 186.38
SECTION A-A
Outlet channel raceway

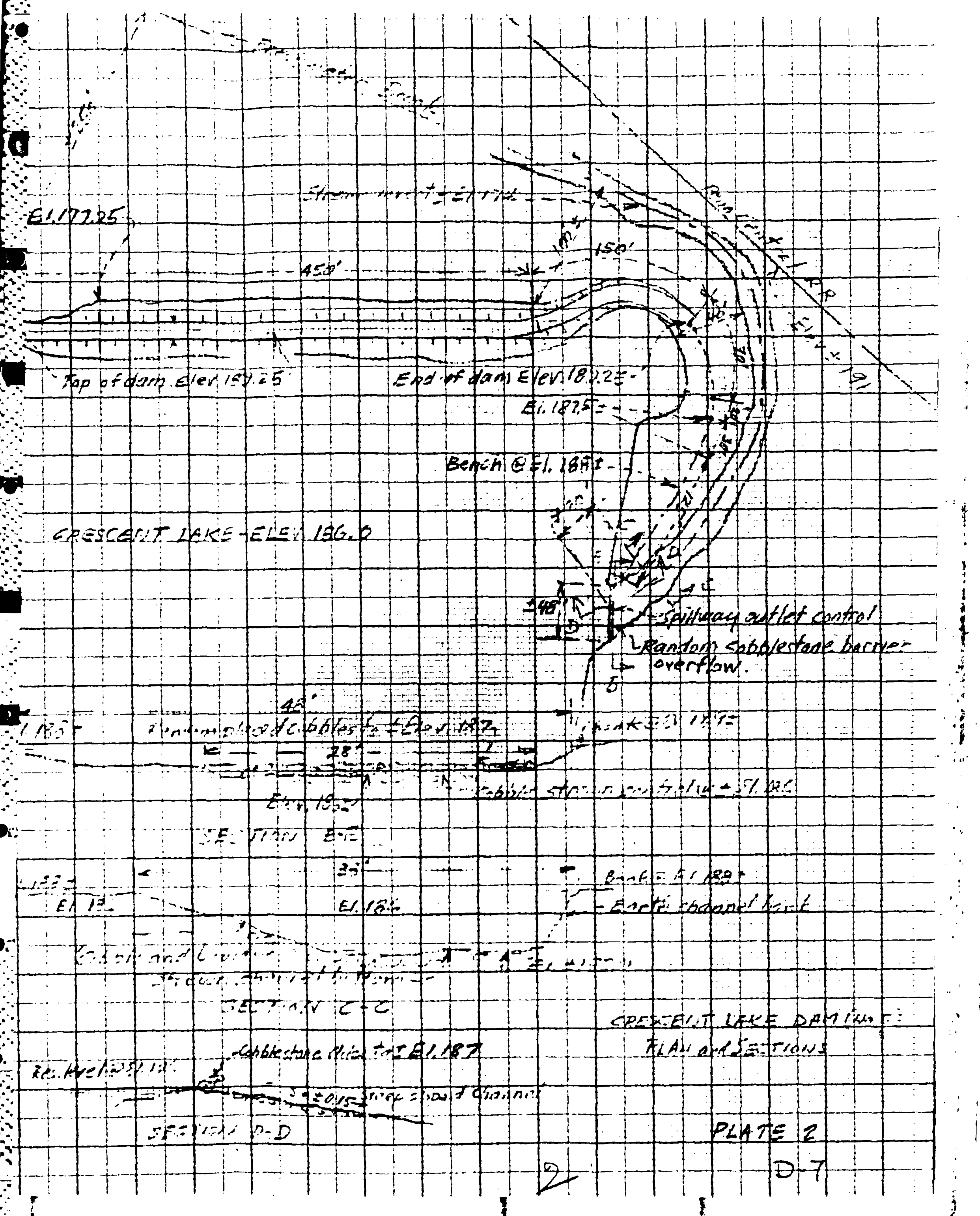
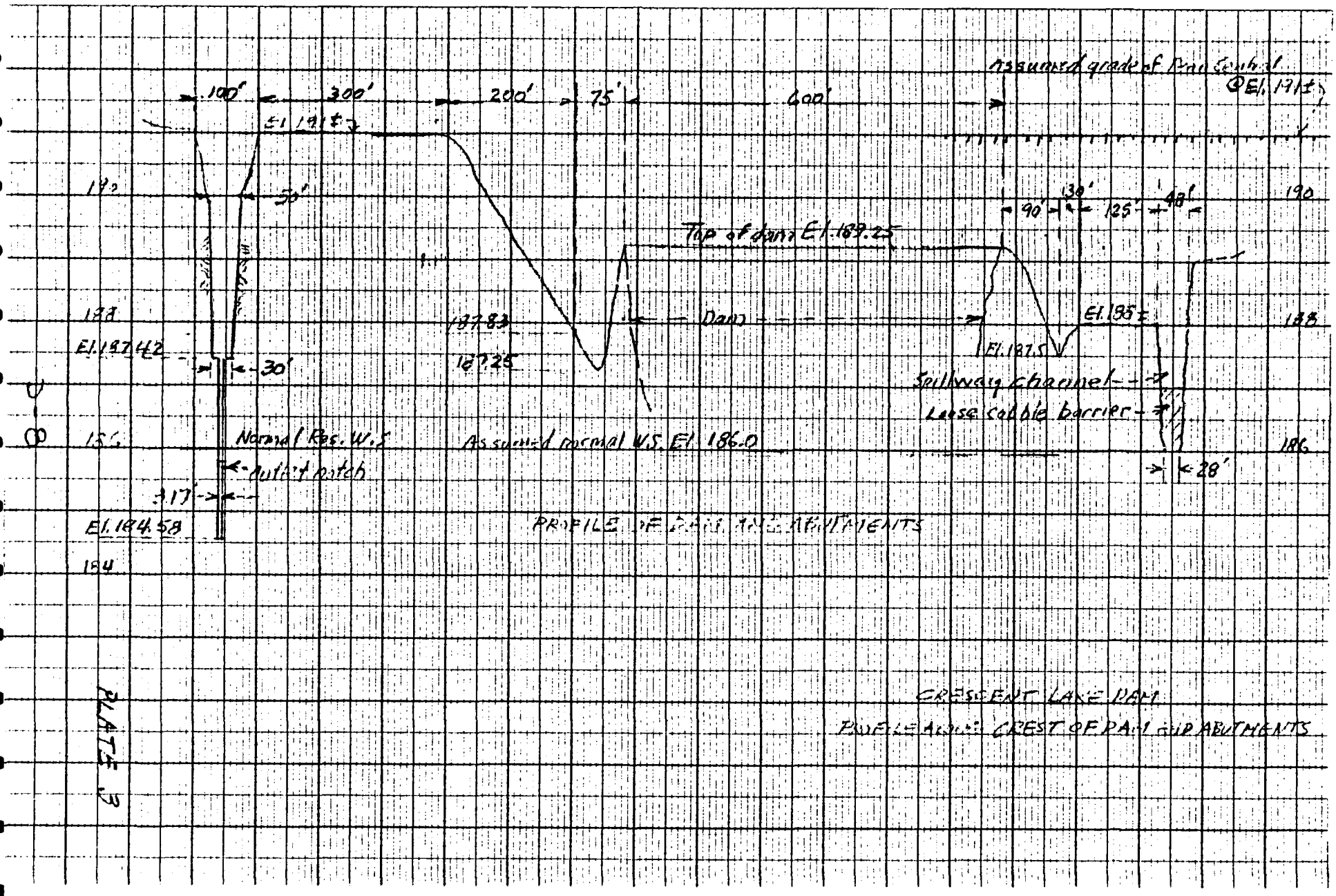
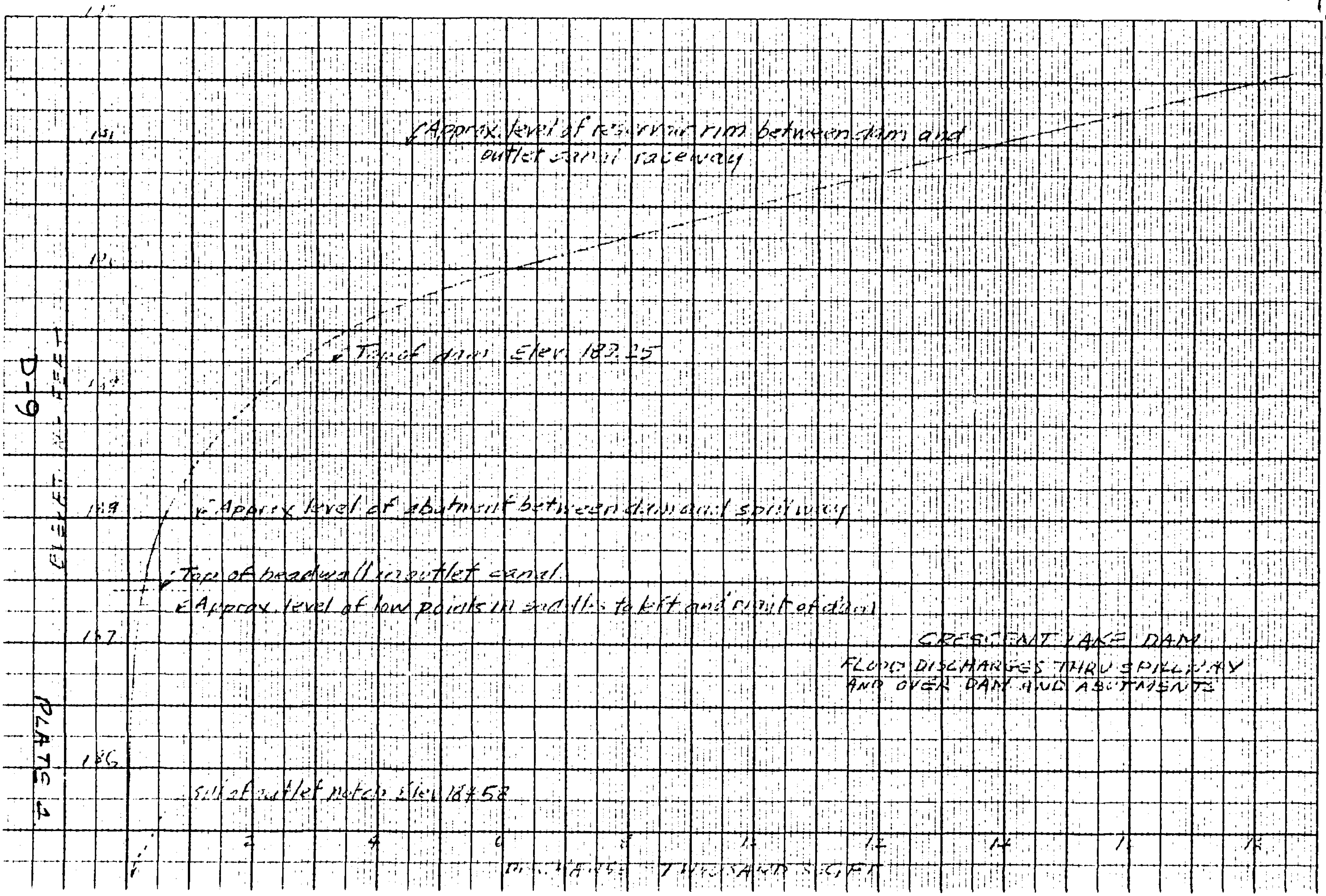

El. 177.25
450'
150'
Top of dam Elev 187.25
End of dam Elev 188.2±
El. 187.5±
Bench @ El. 188±
CRESCENT LAKE - ELEV 186.0
48'
Spillway outlet control
Random cobblestone barrier overflow.
28'
Elev 185
SECTION B-B
El. 184
SECTION C-C
Cobblestone thickness El. 187
SECTION D-D
CRESCENT LAKE DAM
PLAN and SECTIONS

PLATE 2

D-7

KEUFFEL & ESSER CO
MADE IN U.S.A.




Approx. level of reservoir rim between dam and outlet canal raceway
Top of dam Elev. 183.25
Approx level of abutment between dam and spillway
Top of headwall in outlet canal
Approx. level of low points in saddles to left and right of dam
Sill of outlet notch Elev. 184.58
CRESCENT LAKE DAM
FLOOD DISCHARGES THRU SPILLWAY AND OVER DAM AND ABUTMENTS
ELEV. IN FEET
DISCHARGE THOUSAND SCFT
2
4
6
8
12
14

D-9

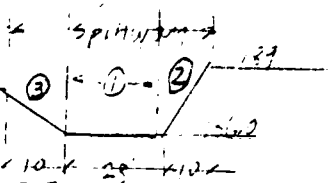
PLATE 1

BY _____ DATE 9-22-15 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 of 3 OF

CHKD. BY _____ DATE _____ INSPECTION OF DAMS - Conn. R.I. PROJECT _____

SUBJECT CRESCENT LAKE DAM - (NO5) DISCHARGE CURVES

SPILLWAY



← Area ①					Area ②				Area ③				
E	H	L	ΔQ1	q/ft	Acc q/ft	L	ΔQ2	q/ft	Acc q/ft	L	ΔQ3	ΣQ
		28.0	-	0			0	0				0
1875	1.25	28.0	3.05	119	4.26	2.13	4.2	9	4.26	2.13	6.2	13	141
1874.2	1.42	28.0	3.08	146	5.21	2.60	4.7	12	5.21	2.60	7.1	18	176
1873	1.65	28.0	3.1	215	7.67	3.84	6.1	23	7.67	3.84	9.2	35	273
1868.0	2	28.0	3.1	246	8.77	4.38	6.7	29	8.77	4.38	10	43	318
1859	3	28.0	3.1	451	16.11	8.06	10	81	16.11	8.06	10	96	628
1849.0	4.0	28.0	3.1	694	24.80	13.95	10	140	24.80	13.95	10	168	1002
1841.5	5.0	28.0	3.1	970	34.66	21.71	10	217	34.66	21.71	10	256	1441
1832.0	6.0	28.0	3.1	1276	45.56	30.84	10	308	45.56	30.84	10	352	1936

BY_____ DATE_____ **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 3 of 3 OF_____

CHKD. BY_____ DATE_____ INSPECTION OF DAMS Contract E. PROJECT_____

SUBJECT CRESCENT LAKE DAM (No. 5) DISCHARGE CURVES

DISCHARGES OVER DAM AND ABUTMENTS

Abutment left of saddle
crest of dam and
canal rock at left bank
L=350

Saddle at left end of dam
237.5 — 191 — 187.25

375 + 189.25 / 187.25

Bench left of spillway
125 @ El 189

Elev	H	Coeff	ΔQ	H	Coeff	Q/ft	Ave Q/ft	Width	ΔQ	H	Q/ft	Ave Q/ft	L	ΔQ	H	Q/ft	ΔQ
															c=2.5		
187.25				0				0	0	0			0				
187.83				0.58	2.5	1.10	0.55	37.5	21	0.58	1.10	0.55	10.9	6			
188				0.75	2.5	1.62	0.81	48.2	39	0.75	1.62	0.81	14.1	11	0	-	0
189				1.75	2.5	5.78	2.89	111.3	322	1.75	5.78	2.89	32.8	95	1.0	2.5	313
189.25				2.00	2.5	7.07	3.54	127.1	450	2.00	7.07	3.54	37.5	133	1.25	3.17	436
190				2.75	2.5	11.40	6.51	174.4	1135	2.75	11.40	6.51	37.5	244	2.0	7.09	884
191	0	-	0	3.75	2.5	18.15	11.97	237.5	2843	3.75	18.15	11.97	37.5	449	3.0	12.99	1624
192	1.0	2.5	1625	4.75	2.5	25.88	14.19	237.5	3370	4.75	25.88	18.64	37.5	699	4.0	20.0	2500

Main Dam L=600'

Saddle right of dam
187.25

30 + 188 / 187.25

Bench right of spillway Co.
189 L=100

Elev	H	Coeff	ΔQ	H	Coeff	Q/ft	Ave Q/ft	L	ΔQ	H	Q/ft	Ave Q/ft	L	ΔQ	H	Q/ft	ΔQ
															c=2.5		
187.25				0				0	0	0			-	0			
187.83				0.58	2.5	1.10	0.55	15.5	9	0.58	1.10	0.55	23	13			
188				0.75	2.5	1.62	0.81	20	16	0.75	1.62	0.81	30	24			
189				1.75	2.5	5.78	2.87	76	220	1.75	5.78	4.14	30	124	0		0
189.25	0		0	2.00	2.5	7.07	3.54	90	319	2.00	7.07	5.28	30	158	0.25	0.31	31
190	0.75	2.9	1130	2.75	2.5	11.40	6.51	90	586	2.75	11.40	9.24	30	277	1.0	2.50	252
191	1.75	2.9	4028	3.75	2.5	18.15	11.97	90	1077	3.75	18.15	15.57	30	467	2.0	7.07	707
192	2.75	2.9	7935	4.75	2.5	25.88	18.64	90	1678	4.75	25.88	22.94	30	688	3.0	12.99	1299

SUMMARY - DISCHARGES

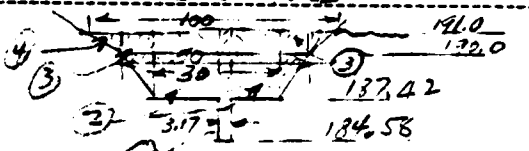
	Outlet	Spillway	Main dam	Left abutment	Right abutment	Total
184.58	0					0
186	8	0				8
187.25	36	141				177
187.42	47	176		0	0	223
187.83	81	273		27	22	403
188	102	318		50	40	510
189	294	628		417	657	1996
189.25	363	725	0	583	944	2615
190	613	1002	1130	1379	1997	6121
191	1080	1441	4028	3292	3875	13716
192	1775	1936	7935	4069	6165	21980

PLOTTED ON PLATE 4.

BY JH DATE 2-22-78 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 2 of 3 OF

CHKD. BY _____ DATE _____ INSPECTION OF DAMS - Conn. & R.I. PROJECT _____

SUBJECT CRESCENT LAKE DAM (No. 5) DISCHARGE CURVES



Outlet at left abutment

	width (1)				width (2)				width (3)				
Elev.	H	width	Coef	Q_1	H	width	Coef	Q_2	H	q/ft	Avg q/ft	width	Q_3
184.58	0	3.17	-	0									
186.0	1.42	3.17	2.5	8									
187.25	2.67	3.17	2.6	36	-	-	-	0	0	0			
187.42	2.84	3.17	3.1	47	0	26.83		0	0	0	-		0
187.83	3.25	3.17	3.1	58	0.41	26.83	3.1	22	0.41	0.81	0.40	3.2	1
188.0	3.42	3.17	3.1	62	0.58	26.83	3.1	37	0.58	1.37	0.69	4.4	3
189.0	4.42	3.17	3.1	91	1.58	26.83	3.1	165	1.58	6.16	3.08	12.2	38
189.25	4.67	3.17	3.1	99	1.83	26.83	3.15	209	1.83	7.80	3.99	14.2	55
190.0	5.42	3.17	3.1	124	2.58	26.83	3.2	356	2.58	13.26	6.63	20	133
191.0	6.42	3.17	3.1	160	3.58	26.83	3.25	591	3.58	22.01	12.56	20	251
192.0	7.42	3.17	3.1	199	4.58	26.83	3.3	868	4.58	32.35	20.56	20	411

	width (4)					
Elev	Head	q/ft	Av. q/ft	width	Q_4	Total Q for outlet
184.58						0
186.0						8
187.25						36
187.42						47
187.83						81
188.0						107
189.0						294
189.25						363
190	0	0		0	0	613
191	1.0	3.10	1.55	50	78	1080
192	2.0	8.77	5.94	50	297	1775

HEC- VERSI- ATED 19
UPDATED AUG 74
CHANGE NO. 01

CRESCENT LAKE DAM INSPECTION
OCT 78
BY TOM CHAPTER

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	0	15	0	0	0	0	0	0	0

JOPER NWT
3 0

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH.

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
5	0	0	0	2	0	1

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	-1	2.05	0.0	2.05	0.80	0.0	0	0	0

PRECIP DATA

NP	STORM	DAJ	DAK
24	0.0	0.0	0.0

PRECIP PATTERN

0.04	0.04	0.05	0.05	0.11	0.11	0.12	0.12	0.18	0.19
0.19	0.19	0.25	0.63	1.62	0.25	0.13	0.13	0.12	0.12
0.09	0.09	0.09	0.09						

LOSS DATA

STRKR	CLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.0	0.03	0.0	0.0

GIVEN UNIT GRAPH. NUHGG= 23

81.	299.	617.	838.	855.	714.	544.	387.	285.	208.
151.	107.	78.	59.	44.	30.	23.	16.	13.	9.
7.	5.	2.							

UNIT GRAPH TOTALS 5372. CFS OR 1.02 INCHES OVER THE AREA

RECESSION DATA

STRTQ= 0.0 QRCSN= 0.0 RTIOR= 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.03	0.02	2.
2	0.03	0.02	9.
3	0.04	0.03	25.
4	0.04	0.03	48.
5	0.09	0.08	78.
6	0.09	0.08	116.
7	0.10	0.09	167.
8	0.10	0.09	225.

10	0.15	0.14	350.
11	0.	0.	[illegible]
12	0.15	0.14	495.
13	0.20	0.19	567.
14	0.50	0.50	663.
15	1.30	1.29	891.
16	0.20	0.19	1297.
17	0.10	0.10	1769.
18	0.10	0.10	2038.
19	0.10	0.09	1993.
20	0.10	0.09	1731.
21	0.07	0.06	1428.
22	0.07	0.06	1157.
23	0.07	0.06	959.
24	0.07	0.06	801.
25	0.0	0.0	674.
26	0.0	0.0	561.
27	0.0	0.0	457.
28	0.0	0.0	358.
29	0.0	0.0	269.
30	0.0	0.0	195.
31	0.0	0.0	142.
32	0.0	0.0	103.
33	0.0	0.0	76.
34	0.0	0.0	55.
35	0.0	0.0	40.
36	0.0	0.0	28.
37	0.0	0.0	18.
38	0.0	0.0	11.
39	0.0	0.0	7.
40	0.0	0.0	5.
41	0.0	0.0	4.
42	0.0	0.0	2.
43	0.0	0.0	1.
44	0.0	0.0	1.
45	0.0	0.0	0.
46	0.0	0.0	0.
47	0.0	0.0	0.
48	0.0	0.0	0.
49	0.0	0.0	0.
50	0.0	0.0	0.
51	0.0	0.0	0.
52	0.0	0.0	0.
53	0.0	0.0	0.
54	0.0	0.0	0.
55	0.0	0.0	0.
56	0.0	0.0	0.
57	0.0	0.0	0.
58	0.0	0.0	0.
59	0.0	0.0	0.
60	0.0	0.0	0.
61	0.0	0.0	0.
62	0.0	0.0	0.
63	0.0	0.0	0.
64	0.0	0.0	0.
65	0.0	0.0	0.
66	0.0	0.0	0.
67	0.0	0.0	0.
68	0.0	0.0	0.
69	0.0	0.0	0.

71	0.0	0.0	0.
73	0.0	0.0	0.
74	0.0	0.0	0.
75	0.0	0.0	0.
76	0.0	0.0	0.
77	0.0	0.0	0.
78	0.0	0.0	0.
79	0.0	0.0	0.
80	0.0	0.0	0.
81	0.0	0.0	0.
82	0.0	0.0	0.
83	0.0	0.0	0.
84	0.0	0.0	0.
85	0.0	0.0	0.
86	0.0	0.0	0.
87	0.0	0.0	0.
88	0.0	0.0	0.
89	0.0	0.0	0.
90	0.0	0.0	0.
91	0.0	0.0	0.
92	0.0	0.0	0.
93	0.0	0.0	0.
94	0.0	0.0	0.
95	0.0	0.0	0.
96	0.0	0.0	0.
97	0.0	0.0	0.
98	0.0	0.0	0.
99	0.0	0.0	0.
100	0.0	0.0	0.
SUM	3.99	3.79	20523.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2038.	823.	214.	205.	20521.
INCHES		3.73	3.88	3.88	3.88
AC-FT		408.	424.	424.	424.

STATION 5

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

0.	400.	800.	1200.	1600.	2000.	2400.	0.	0.	0.	0.	0.	0.
										PRECIP(L) AND EXCESS(X)		
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.2	0.8	0.4	0.0
1 I												LX
2 I												LX
3 .I												LX
4 .I												LX
5 . I												LXX
6 .												LXX
7 .												LXX
8 . I												LXX
9 . I												LXXXX
10 . I												LXXXX
11 . I												LXXXX
12 . I												LXXXX
13 . I												LXXXXX
14 . I												LXXXXXXXXXXX
15 .	I								LXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
16 .		I										LXXXXX
17 .					I							LXXX
18 .						I						LXXX
19 .						I						LXX
20 .				I								LXX
21 .			I									LXX
22 .		I										LXX
23 .	I											LXX
24 .	I											LXX
25 .	I											L
26 . I												L
27 . I												L
28 . I												L
29 . I												L
30 . I												L
31 . I												L
32 . I												L
33 . I												L
34 .I												L
35 .I												L
36 .I												L
37 I												L
38 I												L
39 I												L
40 I												L
41 I												L
42 I												L
43 I												L
44 I												L
45 I												L
46 I												L
47 I												L
48 I												L
49 I												L
50 I												L
51 I												L
52 I												L
53 I												L

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

FLOOD ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
55	1	0	0	2	0	1

ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE=	37.	78.	122.	169.	235.	336.	0.	0.	0.	0.
OUTFLOW=	145.	438.	1784.	5347.	11486.	20150.	0.	0.	0.	0.

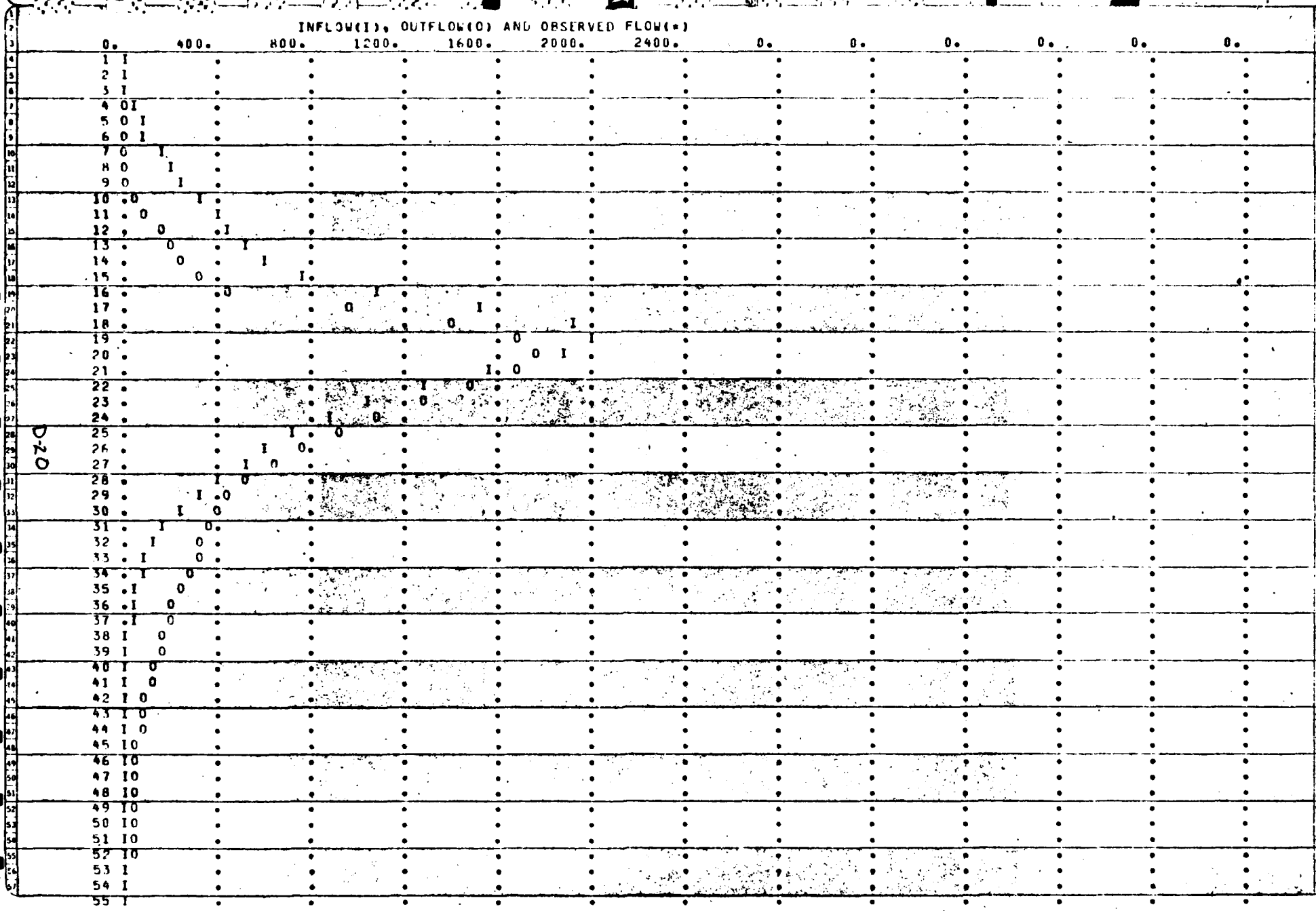
TIME	EOP STOR	AVG IN	EOP OUT
1	0.	2.	0.
2	0.	6.	0.
3	1.	17.	0.
4	1.	37.	0.
5	3.	63.	0.
6	5.	97.	0.
7	7.	142.	0.
8	12.	196.	0.
9	17.	255.	1.
10	23.	318.	44.
11	29.	385.	91.
12	37.	458.	142.
13	44.	531.	195.
14	52.	615.	253.
15	62.	777.	325.
16	77.	1094.	431.
17	94.	1533.	942.
18	110.	1904.	1404.
19	119.	2016.	1698.
20	122.	1862.	1776.
21	119.	1579.	1682.
22	113.	1292.	1495.
23	106.	1058.	1285.
24	99.	880.	1090.
25	94.	738.	921.
26	89.	617.	775.
27	85.	509.	647.
28	81.	408.	532.
29	78.	313.	435.
30	74.	232.	407.
31	69.	168.	374.
32	64.	122.	340.
33	59.	89.	305.
34	55.	65.	272.
35	50.	47.	241.
36	46.	34.	215.
37	43.	23.	187.
38	40.	14.	163.
39	37.	9.	142.

41	32.	4.	107.
42	31.	3.	93.
43	28.	2.	80.
44	26.	1.	69.
45	25.	1.	60.
46	24.	0.	52.
47	23.	0.	45.
48	22.	0.	38.
49	21.	0.	33.
50	21.	0.	29.
51	20.	0.	25.
52	20.	0.	21.
53	19.	0.	18.
54	19.	0.	16.
55	19.	0.	14.
56	18.	0.	12.
57	18.	0.	10.
58	18.	0.	9.
59	18.	0.	8.
60	18.	0.	7.
61	17.	0.	6.
62	17.	0.	5.
63	17.	0.	4.
64	17.	0.	4.
65	17.	0.	3.
66	17.	0.	3.
67	17.	0.	2.
68	17.	0.	2.
69	17.	0.	2.
70	17.	0.	1.
71	17.	0.	1.
72	17.	0.	1.
73	17.	0.	1.
74	17.	0.	1.
75	17.	0.	1.
76	17.	0.	1.
77	17.	0.	1.
78	17.	0.	0.
79	17.	0.	0.
80	17.	0.	0.
81	17.	0.	0.
82	17.	0.	0.
83	17.	0.	0.
84	17.	0.	0.
85	17.	0.	0.
86	17.	0.	0.
87	17.	0.	0.
88	17.	0.	0.
89	17.	0.	0.
90	17.	0.	0.
91	17.	0.	0.
92	17.	0.	0.
93	17.	0.	0.
94	17.	0.	0.
95	17.	0.	0.
96	17.	0.	0.
97	17.	0.	0.
98	17.	0.	0.
99	17.	0.	0.
100	17.	0.	0.

SUM 19713.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1776.	752.	205.	197.	19713.
INCHES		3.41	3.73	3.73	3.73
AC-FT		373.	408.	408.	408.

STATION 55


INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)
0. 400. 800. 1200. 1600. 2000. 2400. 0. 0. 0. 0. 0. 0.

RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	5	2038.	823.	214.	205.	2.05
ROUTED TO	55	1776.	752.	205.	197.	2.05

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
CT	277	CRESCENT LAKE DAM	4200.0	7251.5	30	NOV	78

POPULAR NAME	NAME OF IMPOUNDMENT
	CRESCENT LAKE

RIVER OR STREAM	NEAREST DOWNSTREAM CITY – TOWN – VILLAGE	DIST FROM DAM (MI.)	POPULATION
FRESHWATER BROOK	THOMPSONVILLE	.5	15000

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
[illegible]	1900	R	12	12	335	210	NED	N	N	N	N	13DEC78

REMARKS

SPILLWAY TYPE	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
[illegible]	725												

OWNER	ENGINEERING BY	CONSTRUCTION BY
STATE OF CONNECTICUT	SHAKER COLONY	SHAKER COLONY

REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
[illegible]	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
[illegible] & ASSOCIATES, INC.	25	SEP	78	PL92-367

REMARKS

END

FILMED

DTIC